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EVALUATION OF EFFECTS OF THE QUALITY OF CARE OF SELECTED ALTERNATIVES FOR PAYING PHYSICIANS UNDER THE MEDICARE PROGRAM

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PREFACE

Congress is considering altering the way Medicare pays for physicians' services. This work attempts to provide a framework for thinking about the ways a physician payment system can influence medical care, and to anticipate the kinds of effects that several possible alternative systems might have on the quality of care of Medicare patients.

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SUMMARY

Congress is considering alternative ways of paying for physicians' services to Medicare patients. Our purpose in this essay is to anticipate the effects of several alternative ways of paying for physicians' services on quality of personal health care. We have reviewed the literature for studies which relate quality of care to current systems of paying for physicians' services (fee for service and health maintenance organizations), and developed a framework for use in analyzing the effects of physician payment systems on quality of care. We have examined six alternatives: fee for service with a fee schedule that places greater weight on cognitive services than current Medicare reimbursement arrangements, paying for inpatient physician services on the basis of Diagnosis Related Groups (DRGs), increasing enrollment in health maintenance organizations, "geographic capitation" or risk-sharing contracts with carriers for part B services, and two kinds of service packaging. Each alternative was analyzed using the framework developed, and the effects of each alternative illustrated for several "typical" Medicare patients. We cannot predict the quantitative net effect of each alternative scheme; we cannot rank the alternatives with respect to expected impact on quality of care. The uncertainty of the impact on quality of care of any alternative payment system (and of the present one) demonstrates the need to monitor and attempt to assure quality of care for any new system instituted--or when mounting a demonstration or experiment. By predicting the kinds of effects on quality of care likely to occur under each alternative, our analysis provides guidance as to where monitoring and quality assurance should be focused.

I. INTRODUCTION

The purpose of this paper is to anticipate the kinds of effects on the quality of personal health care services that would result from each of several alternative ways of paying for physicians' services to Medicare patients. To do this, we must define quality of care and try to understand how different levels of quality of care are produced.

Ideally, we would begin by developing a comprehensive and complete analytical framework or model that specified the elements known to determine performance of the medical system and the level of quality of care. The model would then be used to predict the effects of changing the way physicians are paid on the performance of the system, and the quality of the care provided.

Unfortunately, this is not possible. While the theoretical foundation is adequate to specify a number of important variables that should be included in such a model, the empirical work necessary to validate the theory and to calibrate the relationships among important variables has not been done (Hornbrook and Berki, 1985).

We therefore take a qualitative approach based on general economic principles and a thorough review of the literature, although the shortage of empirical work is still limiting. For instance, it is reasonable to assume that the amount and types of services provided by many if not all physicians will be influenced by how they are paid for those services, and by the organizational setting in which they provide care, e.g., solo, group practice, or prepaid group. The empirical work to determine precisely how physicians will perform in each of these forms of payment and practice organizations does not exist. Not only is the amount of the empirical work limited, but it derives mainly from the study of medical practice prior to 1982, and much of it comes from the 1950s and 1960s. Organizational change in medicine has been particularly rapid in the last decade, so experience from the past can be extrapolated to the future only with considerable hazard.

The task of anticipating effects on quality of care from changes in physician payment systems is made even more difficult by the fact that these changes would be superimposed onto a medical system already undergoing widespread and incompletely understood change from forces such as Medicare's Prospective Payment System (PPS) and increases in the numbers of physicians.

The several alternative payment methods that are examined in this paper were specified in very general terms by the Office of Technology Assessment.[1] They do not represent fully specified payment systems, but rather skeletal outlines of classes of payment options. The organizational and bureaucratic structure through which each would be implemented was not specified: many alternative structures are possible. Consequently, we will focus on the general properties of each alternative payment scheme. These properties can be expressed in terms which lend themselves to economic analysis of the incentives and constraints implied by each payment scheme. Where appropriate, we will also incorporate into the analysis the effects of organizational structure associated with a payment option. However, the general nature of the specification of each payment alternative and the limited amount of previous work will result in our relying on a relatively simple economic model.[2] Even when using this more simple approach, data needed to answer fundamental questions are more often than not missing.

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[1] These payment options are thought to be under consideration by policymakers. They are not necessarily the "best" in terms of the impact on quality of care.

[2] In analyzing the effects of changing financial incentives on patients' and physicians' decisions, it is appropriate to employ the language and theory of economics. This does not mean that the patient or physician is to be reduced to an "economic man" caricature in this analysis. The theory of economics provides a useful way to analyze decisions affected by economic incentives and constraints. However, other incentives and constraints may play a role, and we will take these into account. For example, paying each physician a fixed fee for each unit of service rather than a fixed amount per episode of illness or per person creates an incentive for the physician to increase his income by doing more of each procedure. This does not mean that the physician will suggest unnecessary surgical procedures to his patients. He may feel constrained by his code of ethics to provide to each patient only what he perceives that patient to need or by the organizational setting in which he practices.

How might changing the method of paying for physicians' services affect quality of care? First, changing the scheme of physician payment could affect physicians' decisionmaking in ordering medical services for their patients. Second, changes in the physician payment scheme and physicians' decisions could have an impact on patients' decisions. For example, if a physician raises his fees and does not take assignment, the patient is faced with higher out of pocket costs and may change to a physician with lower fees (perhaps a less specialized physician) or reduce his consumption of medical care. Third, an alternative physician payment system may be accompanied by changes in the organizational or institutional setting of care, such as changing from solo practice with fee for service reimbursement to the prepaid group practice form of a health maintenance organization (HMO). Such changes in organization of care may also affect the quality of care. Fourth, in the longer term, modification of physician payment could affect decisions of physicians with respect to location of practice, whether and how to specialize, and whether to invest time and money in acquiring and learning new medical technology and practices.

Because of the difficulties in projecting effects on quality of care, the end point of our analysis will be the prediction of where threats to quality lie for each payment scheme. We will supplement our analytical work by illustrating how quality of care could be affected for a number of typical Medicare patients under each payment scheme. We will then suggest how one might monitor and assess the quality of care if Medicare were to adopt some form of the payment mechanisms proposed.

II. APPROACH TO ANALYSIS

The quality of personal medical care is in large part determined by the amounts and types of health care resources used to diagnose and treat a patient's condition. Decisions as to what services to use are made jointly by the patient and his physician. Since the physician's income and the patient's costs are affected by which services are used, financial factors may affect these patient care decisions.

The structure of the payment mechanism for medical services in part determines the physician's (and patient's) financial incentives for the use of particular medical services. Changing the system for paying for physicians' services alters these financial incentives and so leads to changes in the amounts of medical services used. An analysis of these changes forms the basis of our conceptual approach to predicting the effects of alternative payment methods on quality of medical care.

In this section, we elaborate the conceptual framework on which the analysis in the rest of this Report is based. We define what we mean by "quality of care." We characterize the physician-patient interaction. We suggest some mechanisms by which changing physician payment schemes might affect quality of care. Finally, we discuss the relationship between quality of care and cost.

Our approach draws upon the theory of and previous work in economics that examines physician behavior. The reader who is not interested in the analytical and more theoretical framework may wish to skip this section and proceed to the literature review.

QUALITY OF CARE: DEFINITION

Quality of medical care is difficult to define; multiple definitions exist (Donabedian, 1980). Donabedian (1980) defined quality of care in the following general terms:

> Quality is a property of, and a judgment upon, some definable unit of care [personal health care], and that care is divisible into at least two parts: technical and interpersonal...At the very least, the quality of technical

> care consists in the application of medical science and technology in a manner that maximizes its benefits to health without correspondingly increasing its risks. The degree of quality is, therefore, the extent to which the care provided is expected to achieve the most favorable balance of risks and benefits....What constitutes goodness in the interpersonal process is more difficult to summarize. The management of the interpersonal relationship must meet socially defined values and norms that govern the interaction of individuals in general and in particular situations. The norms are reinforced in part by the ethical dicta of health professions, and by the expectations and aspirations of individual patients. It follows that the degree of quality in the management of the interpersonal relationship is measured by the extent of conformity to these values, norms, expectations, and aspirations. (p. 5)

Brook and Williams (1975) state the definition of the quality of personal health care in this way:

> Quality of care = (technical care) + (art of care) + (technical care)(art of care) + (error)
> Here, technical care includes the adequacy of the diagnostic and therapeutic processes. Art-of-care relates to the milieu, manner, and behavior of the provider in delivering care to and communicating with the patient. The interactive term emphasizes the notion that the two terms are not just additive. (p. 134)

A comment on this formulation of the definition of the quality of the physician-patient interaction may help "flesh it out" (Brook and Avery, 1976):

> Regarding the physician-patient interaction, the following variables have been considered important: (1) the adequacy of the technical management of the symptoms or signs which the patient presents to the physician; (2) the adequacy of the "art of care;" ... Technical medical care here is taken to represent the adequacy of the performance of preventive, diagnostic, and therapeutic procedures *vis-a-vis* the patient's needs or conditions. Art of care refers to the manner of physician care relative to the patient as an individual, as measured by its sensitivity, openness, and nonauthoritarian nature. (p. 3)

Most studies of quality of care focus on the quality of technical care. Some authors, including Donabedian, include the efficiency with which care is provided (and thus cost of care) in the definition of quality of care. We prefer to consider efficiency and cost as separable goals from achieving a given level of quality of care.

We recognize three aspects or measures of quality: structure, process, and outcome. These can be illustrated as follows (Brook et al, 1976):

> Structural measurements are concerned with descriptive, innate characteristics of facilities or providers (for example, the soundness of a building, whether a poison chart is posted in an emergency room, or the age and board-certification status of the physician). Process measures are simply those that evaluate what a provider does to and for a patient (for example, ordering a cardiogram for a patient with chest pain) and how well a person is moved through the medical care system... Outcomes reflect what happened to the patient, in terms of palliation, treatment, cure, or rehabilitation... The conceptual distinction among these measures is important to maintain because in essence they measure different things: the resources necessary to solve a problem, the way the problem was solved, and the results of the problem solving, respectively. (p. 809)

We restrict our analysis to the physician-patient interaction. Many aspects of quality of medical care thus fall outside our analytical scope, including access to care (financial and physical accessibility of medical services). In some parts of our analysis, we will broaden the scope to include some of these aspects of quality, particularly access to care.

FOCUS OF ANALYSIS: DECISIONS IN THE PHYSICIAN-PATIENT INTERACTION

As stated above, the resources committed to a patient's care, along with the process by which they are committed, are determined in part by decisions made by the physician acting on behalf of the patient. The patient does not usually have enough information, such as knowledge of the efficacy of medical procedures, to decide unaided what and how much medical care he needs. It is the physician's role to make patient care decisions or to help the patient make these decisions as the patient

would if the patient knew everything the physician knows. The ethic of the medical profession requires that the physician make patient care decisions considering ONLY the patient's interests; he is not to consider his own interests, financial or other, in making these decisions. A physician making decisions in this manner is said to be acting as a "perfect agent" of the patient. (This does not mean he makes perfect decisions, only that he is entirely committed to the patient's welfare to the exclusion of other interests including his own.)

We will generally assume in this analysis that the physician is not always a perfect agent, i.e., that his own interests affect his decisions. If the physician is not a perfect agent, one would expect that the financial incentives inherent in the way he is paid will influence his decisions and affect the quality of care.[1] If a physician's income is increased by doing an additional diagnostic procedure for a patient, he may be influenced toward doing the procedure. Similarly, if a surgeon is considering hiring a second surgeon to assist him in a difficult operation, he may be less likely to do so if the assistant's fee must be paid from the amount the attending surgeon receives for the operation. If the surgeon has to pay out of his own pocket for a consultation, the number of both appropriate and inappropriate consults may decrease.

Another financial factor influencing physicians' decisions is the risk of malpractice. This may lead to the use of tests and consults which do not otherwise contribute to the patient's welfare. This practice of "defensive medicine" may affect not only the cost of care, but also its quality.

Physicians' decisions thus influence the quality of care. So do the decisions of patients.[2] However, because we are analyzing the

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[1] There is a body of literature in economics which examines how a physician can maximize his patient's health using inputs including his own time and effort (for example, see Newhouse, 1978; Pauly, 1979, 1980; Woodward and Warren-Boulton, 1984; Donabedian, Wheeler, and Wyszewianski, 1982). This work examines the concept of agency and analyzes effects on physician decisions under different assumptions about the degree to which the physician functions as the patient's agent, the way physicians are paid, and distortions in prices of inputs. Our analysis draws upon this body of work.

[2] The patient's decisions are affected by the patient's financial incentives and constraints, given his needs or wants for health care

effects of changing the way we pay for physician services, we will emphasize the physician's part in personal medical care decisionmaking. If changes in the way patients pay for services are also occurring (e.g., by joining an HMO with minimal copayments), this will also be considered. In addition, physicians work within organizational structures that influence how they make decisions, and what resources are available for caring for patients. These influences on physician (and patient) decisions must be taken into account. If such a comprehensive framework can be constructed, we can then ask how the way physicians are paid will affect physician decisionmaking and the quality of personal health care (Hornbrook and Berki, 1985).

Mechanisms of Influence by Payment Schemes

Changing the way physicians are paid for their services could affect quality of care through each of several mechanisms. We emphasize here that changing the method of paying physicians would affect quality of care by changing the personal financial incentives associated with physicians' patient care decisions. Of course, physicians can be expected to vary in the degree to which self-interest influences their patient care decisions, and the effects of financial incentives on the decisions of any given physician are also likely to vary. Also, the physician's own interests would be more likely to influence those medical care decisions for which the medically and ethically correct decision is unclear. For example, if the physician is considering doing a diagnostic procedure that has only a small chance of contributing useful information to the patient's care, he might be more likely to do the procedure if he also receives a large fee for doing it. It is less

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services (affected in turn by his cultural, social, and psychological framework). For instance, increases in patients' coinsurance for medical care lead to decreases in the amount of services used (Newhouse et al, 1981). We will generally assume that the patient's incentives are not changing, and that the patient's decisionmaking is not directly affected by changes in the physician's financial incentives. However, it will be necessary to recognize secondary effects of physicians' decisions on patients' decisions, as in the example of increased fees of a physician who does not take assignment, and effects of organizational changes. The cultural and social factors affecting demand for health care themselves change from time to time. Such changes may be occurring in the 1980s; that is beyond the scope of our analysis.

likely that a physician would do a procedure that is known to be useless and poses a significant risk for a patient just to increase his income (Evans, 1974).

In addition to the influences from his own financial incentives, an individual physician's decisions may be influenced by competition from other physicians for patients. In a mixed system of reimbursement for medical care such as that in the United States, the practice of fee for service physicians will be influenced by the presence of physicians providing care in health maintenance organizations (HMOs) and other settings as well as by the presence of other fee for service physicians. This presence of a larger mixed market for physician services may tend to bring closer together the practice patterns of physicians in the several settings. That is, if an HMO considered skimping on services, the presence of fee for service practitioners to which HMO patients could go may restrain this tendency. Many believe that this market works very imperfectly so that most physicians are able to make decisions without much consideration given to the implications of competition. The evidence on the effectiveness of market competition on physicians' decisions is conflicting (see literature review below).

Method of payment can influence physicians' decisions in other ways. A payment scheme may increase or decrease the rate of improvement of medical knowledge or its adoption and diffusion into practice (technological change). It may induce physicians to become better or less well informed, to improve their decisionmaking skills, or to invest in more effective medical technology. A different payment scheme may encourage or erode patient agency. Changing payment schemes may result in different external constraints on physicians' decisions, as through utilization review by a Peer Review Organization, or administrative practices of a HMO. In the longer term, changing the payment scheme could affect decisions about practice location and specialization.

Changes in Medicare physician payment do not occur in isolation. Payment mechanisms and payment levels for physician services differ among patient groups (e.g., Medicare, Medicaid, and private insurance) and this may result in differences in the amount and quality of care received by each group. If the financial return to caring for one group is consistently below that for caring for another, physicians may provide less care and perhaps care of lower quality to that group.

Decisions Affecting Quality of Care

The decisions made by the physician and patient that are most important for this analysis are those which both affect the quality of patient care and which may be influenced by changing financial incentives or by changing constraints under each payment scheme. These decisions, which determine the content of care and how it is delivered, and so affect the outcome for the patient, include:

- the number and frequency of initial and repeat outpatient visits;
- the content of each visit: the resources devoted to determining the cause of the problem for which the patient initiated care (diagnosis) and the management of that problem; these include diagnostic tests, consultative visits with other physicians, and the physician's own time;
- whether to prescribe outpatient drugs and devices, and which to prescribe;
- whether certain diagnostic and therapeutic procedures not usually a part of the physician visit should be done, and if so, as outpatient or inpatient procedures; for example, certain surgical procedures; choice of practitioner to perform each;
- whether to hospitalize the patient and at what stage or severity of the disease; more generally, how much to diagnose and manage the patient's medical problem as an outpatient vs. inpatient; quality of hospital chosen;
- the content of the hospitalization: in-hospital visits by the attending physician and by consultant physicians, diagnostic and therapeutic procedures by the attending physician and consultant physicians, laboratory tests used in diagnosis and management, drugs, the length of the stay (the decision to discharge) and the accompanying hospital services such as nursing, the use of intensive care services, and the amenities associated with each service;

- post-hospital care: the use of a skilled nursing facility or home health services;
- long-term care: to admit to a nursing home, and the content of nursing home care.

These decisions may be categorized into those determining whether to provide service; how intensively to provide services, such as how far to pursue an uncertain diagnosis before beginning treatment; what quality of each service to provide (as consultant or drug); where to provide a service, as inpatient or outpatient; and which type of service to provide, as medical or surgical treatment for coronary artery disease or peptic ulcer.

These services also include many that are not usually explicitly paid for as separate services, such as educating, counseling, and reassuring the patient. Provision of such services may be particularly likely to change with changing financial incentives.

QUALITY AND COST IN PHYSICIAN-PATIENT DECISIONS

How many resources should be committed to each patient's care? The answer to this question depends upon the point of view taken. If care of the highest quality is to be provided with a limited amount of risk or cost of inputs, then each input should be used to the point that the improvement in health is valued at least as much by the patient as the risks and costs resulting from its use (Donabedian, Wheeler, and Wyszewianski, 1982). For instance, the additional information gained from consultation with a specialist would be weighed against the discomfort and risk of the additional examination and associated diagnostic tests and procedures, and the cost; the decision to prescribe a drug would rest on its expected benefits in improving the patient's condition, weighed against its risks of side effects, and its cost.

Which costs are to be included in making these decisions? The physician acting as the patient's agent would certainly take account of all non-monetary costs to the patient such as pain and anxiety. Use of tests, consults, and other inputs which represent a risk or discomfort to the patient without any expected benefit would reduce the expected "net benefit" to the patient.

Should monetary costs of the resources also be included? Donabedian, Wheeler, and Wyszewianski (1982) distinguish three cases. One might argue that the physician should ignore all financial costs when taking care of his patients; Donabedian calls this the *absolutist* approach to medical decisionmaking. This seems unlikely to be the predominant mode of patient and physician behavior. Most would agree that the money spent on the resources used in the patient's care should be considered since this money, if not used for the patient's health care, could be used for other purposes valued by the patient. From the point of view of the individual patient, the physician should balance the net benefits of care to the patient against the costs (net of insurance) to the patient; costs to society of each input are not considered in this *private optimum*. If the patient has health insurance, the net cost to the patient of each resource used is less than the price of that resource to the patient.[3]

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[3] In many cases, the market price of a resource can be taken to reflect the value of that resource to society (its opportunity cost). Prices of inputs into medical care will differ from social costs for several reasons, including the presence of insurance and tax policy. Insurance reduces the price to the patient at the time of use for many inputs. Many believe that the market for physicians' fees has resulted in fees which often differ from social costs (see Literature Review). These differences would influence physicians' decisions to use inputs in patients' care. A physician who is trying to be a perfect agent for his patient by using all services so that the additional benefit to the patient is equal to the cost to the patient may not provide care of optimal quality (Pauly, 1979, 1980). The physician would be expected to order more than the socially optimal amount of those services covered by insurance. In this case, the physician would use services until the additional benefit to the patient was equal to the cost to the patient, which is less than the market price and the marginal social cost. For example, in the past it was considered commonplace for physicians to hospitalize patients with only inpatient insurance coverage for diagnostic tests that could be done as an outpatient. This not only increased the cost of care more than its value to the patient, but also may have subjected the patient unnecessarily to the risk of a hospital-acquired infection (and thus lowered quality of care).

While prices to an insured patient are distorted downward, prices to the payer may be distorted upward (Pauly, 1979). For example, a physician may charge a very high fee for a procedure which is no longer difficult and so would require a smaller fee in an uninsured competitive market. This can adversely influence the quality of care when the patient is the payer, i.e., when the patient is uninsured. In such a case, the patient's physician may hesitate to order the overpriced

Donabedian et al (1982) argue that the physician should value inputs at their costs to society, though they note that this may cause a conflict of interest for the physician as agent of the patient. If inputs are valued only at the cost to the patient, and patients and their physicians seek the private optimum, then patients will consume resources for medical care that would be of greater value to them in other uses, such as housing, education, or entertainment (Donabedian, Wheeler, and Wyszewianski, 1982; Pauly, 1979). If *all* physicians employ resources so that net benefits for each patient are equated to costs to society for the resources used (the *socially optimal* point), then each patient can be better off; each can have more of other goods and services which he values more than the foregone extra medical care, largely because he will not have to pay for the "excess" use of resources by other persons through taxes or insurance (Pauly, 1979).

However, each patient must be expected to consider his costs at the time of input use to be the prices of those inputs net of insurance, and so will demand the private optimum. Each physician, as agent of the patient and through competition with other physicians for patients, will attempt to meet the patient's demand under the present physician payment system. Physicians will consider the monetary costs to their patients, but will not (and perhaps should not) consider the full costs to society of resources used. Many of the studies examining utilization of medical services and quality of care appear to make the implicit assumption that the private optimum is the standard for medical decisionmaking. The evidence needed to compare actual practice to the social optimum generally does not exist (Pauly, 1979).

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operation or diagnostic procedure.

In each case, the patient does not receive the care which is socially optimal. In one case, he is denied resources which would provide greater benefits than costs; in the other, he receives services which yield benefits worth less than their costs. For a more complete analysis of optimal physician decisionmaking which takes account of externalities as well as divergence of market prices from opportunity costs, see Pauly (1979, 1980).

CONCLUSION

Each patient care decision by the physician and patient involves choices about how many and which resources are used and the cost of the services. The way in which medical services are paid for can affect the financial incentives for the physician associated with each decision. These decisions are made within the constraints and other influences associated with the organizational setting of care. Physicians' decisions are influenced by the competition from other providers of medical services, and by the threat of malpractice suit. Finally, the results of changes in Medicare's physician payment scheme will depend in part on the way physicians are paid for caring for non-Medicare patients. Analysis of patient care decisionmaking, taking account of these influences, forms the basis of our approach to predicting the effects on quality of care of alternative ways of paying for physicians' services.

III. LITERATURE REVIEW

We undertook this literature review to find out how much is already known about the key questions we are addressing: What is the quality of care delivered by physicians paid in different ways? How do other factors, such as the way patients pay for care, or the organizational form through which care is provided, affect quality of care?

The literature on this subject is limited (Hornbrook and Berki, 1985). For instance, a study may demonstrate differences in quality of care provided by salaried physicians in a large prepaid group practice versus care provided by solo physicians being paid fee for service. However, it is usually impossible to determine whether these differences derive from differences in the ways the physicians were paid, in the organization of their practices, in utilization controls used in the two settings, in financial incentives facing patients, or in other factors. In addition, the differences in quality of care and certainly use of services among providers within a category of practice (e.g., prepaid group practice or solo fee for service) are greater than are the differences between categories of practice (Hornbrook and Berki, 1985; Wennberg, 1985; Luft, 1981; Wennberg and Gittelsohn, 1982; Brook, Lohr, et al, 1984).

The framework described in Section II suggests that changes in physician payment will affect quality of care through influencing the physicians' decision to use selected services. These decisions include whether and when to hospitalize, whether to refer the patient to a specialist, whether to recommend surgery, and how many diagnostic tests or procedures to employ in an attempt to make a definitive diagnosis. If services are provided that are of little or no benefit and entail risks to the patient, then use of these services may reduce quality of care. Similarly, failure to provide services that would be benefitial to the patient decreases the quality of care.

The "theoretical" literature on this subject is large (e.g., see Hadley, 1984; Jencks and Dobson, 1985; Gabel and Redisch, 1979; Wallack, 1985; Wyzsewianski, Wheeler, and Donabedian, 1982). This review,

however, will concentrate on empirical work--most of it in the form of studies that compare fee for service practice with prepaid practice in a Health Maintenance Organization. Unfortunately, most of the empirical literature is based on studies completed prior to 1982, and many studies are of practice in the 1950s and 1960s. Effects of recent changes in reimbursement and utilization review, which appear to be having large effects on medical practice, are not reflected in these studies, nor is the effect of the increasing physician supply.

Donabedian (1980, 1982, 1985) has reviewed most of the literature on quality of care. These three volumes provide an excellent critical review of what we know about quality of care, including the effects on quality of how we pay physicians and how services are organized. We limit our discussion of topics covered by Donabedian to a summary sufficient to give the reader an understanding of the background and implications of the sections that follow.

FEE FOR SERVICE

Before considering the possible effects of fee for service on quality of care, we outline the nature of the fee for service system (described in full in Showstack et al, 1978; Gabel and Redisch, 1979; Burney et al, 1979). Medicare pays the physician for each of a myriad of separately coded and billed services. The fee to be paid for each service is determined by the "customary, prevailing, and reasonable" methodology and by limits set by the Medicare economic index. Because about seventy percent of physician fees by Medicare are limited by the economic index (Burney, I., personal communication), the Medicare physician payment system may be characterized as approximating a fee schedule embodying certain systematic patterns: "...the Medicare economic index has resulted in Medicare's physician reimbursement system becoming a series of specialty-specific local fee schedules set at the economic index-constrained prevailing charge levels. This has occurred because physicians' actual and customary charges are increasingly constrained by the more slowly rising economic index; consequently, the economic index-adjusted prevailing charges increasingly determine the Medicare payment amount. The resulting fee schedules lock into place all of the relative price patterns in the Medicare fee system." (Burney et al, 1984).

The fee paid for a particular coded service varies systematically by the site of service, the geographic location of the physician, and physician specialty. The structure of the Medicare fee for service physician payment system is believed by many to have resulted in patterns of relative fees and incentives for physician behavior that, if unchecked, lead to undesirable utilization patterns. Market forces and non-market constraints such as utilization review would tend to counter these incentives; there is disagreement about the effectiveness of these counter forces. The patterns of relative fees also affect physician decisions as to specialization, practice location, and investing time and money in learning new practices and acquiring new equipment. These effects on utilization patterns can affect quality of care.

Patterns of Relative Fees and Their Effects

Here are some of the features of Medicare's fee for service payment system that could lead to undesirable utilization patterns (Gabel and Redisch, 1979; Burney et al, 1979; Burney et al, 1984; Wyszewianski, Wheeler, and Donabedian, 1982; Jencks and Dobson, 1985; Roe, 1981):

- Physicians receive a higher fee per unit time and effort for surgical and technical procedures such as endoscopy than for less technical or more "cognitive" services such as examining and counseling the patient. Hsiao and Stason (1979) estimated that there was a several-fold difference in the hourly reimbursement rate between surgical procedures and office visits. This is thought to encourage the physician to provide more of those surgical and technical physician services yielding higher fees per unit time, and to encourage physicians to enter surgery and the medical subspecialties.
- Fees for new procedures remain inappropriately high relative to fees for older procedures: a complex or difficult new procedure is introduced at a high price which does not fall as the time, effort, skill, and cost required to provide the service decrease. Most such services are surgical or "technical," contributing to the relatively high fees for these services.

- The nominal fee for a particular service is generally higher when the service is done in a city than in a rural area; this is thought to provide an incentive for physicians to locate in metropolitan rather than in rural areas. However, fees may not be systematically higher in relation to living expenses in urban as opposed to rural areas.
- A specialist generally receives a higher fee than does a less specialized physician for identically coded services. For services that appear to be equally within the abilities of specialists and generalists, this may represent different fees for the same quality of service (it is of course difficult to determine for which services the quality is the same for a specialist and generalist). This is thought to provide an incentive for physicians to specialize.
- Since a fixed fee is paid per unit, a physician may be able to increase income by doing more of each service, or by recoding services to a higher paid category (e.g., from a "brief visit" to a "complex visit"). This may result in billing and provision of services with little or no benefit to the patient; if so, this would subject the patient to risks not balanced by benefits from additional procedures. It would also increase the cost of care. Whether physicians already indulge in this kind of coding creep to the extent possible is not known.
- The physician can "unbundle" and separately bill for services that were previously billed as part of a larger unit, raising the total cost of care. For example, routine laboratory tests initially included in the bill for the office visit could be billed separately from the visit, while the physician continues to charge the old fee for the visit. This may result in additional costs to the patient, and demand for the physician's services may be affected.
- A physician's customary fee and area physicians' prevailing fees in the following year are based on this year's charges. This creates an incentive to raise this year's charges in order not to limit the allowable charge in the following year. (The

Medicare economic index limits the increase in reasonable charges.)

These characteristics have several implications for supply, demand, utilization, and competition in the market for physicians' services. If the physician is able to increase the billing and provision of services that are not of benefit to the patient without loss of patients, then we must assume that the physician can set fees and provide services to patients without much constraint. That is, the physician can set his fees and then, if he wishes, "induce" demand for his services. There is a large and contradictory literature on this subject (e.g., see Fuchs, 1978; Stano, 1985; McCarthy, 1985; Reinhardt, 1978, 1985; Evans, 1974; Bureau of Health Manpower, 1984). Of course, the physician's professional ethic, to function as the agent of the patient, will limit the influence of financial incentives on his decisions. The strength of the medical ethic is not known.

There is evidence that market forces influence the practice location decisions of physicians (Newhouse, 1982a, 1982b; Williams et al, 1983; Schwartz et al, 1980). As the number of specialists has increased, the probability has increased that a small town will have a physician of a particular specialty. Thus, constraints on physician decisions operating through the market do have an effect; physicians cannot increase demand for their services without limit. Moreover, if having a physician in a given specialty is a valid indicator of quality, then this should result in an improvement in quality.

Unless patients have complete first-dollar insurance coverage without copayments, their out of pocket costs will increase when a physician orders an additional service, recodes a service to a category with a higher fee, or "unbundles" a service to be billed as two or more services. Patients' use of medical services has been shown to fall as their cost-sharing increases (Newhouse et al, 1981; Leibowitz et al, 1985). This suggests that patients will reduce their use of physicians' services for which their out of pocket costs increase, particularly if they do not perceive benefit from the services. This could negatively affect quality of care.

Jencks and Dobson (1985) cite several kinds of evidence suggesting that the strength of the effect of competition in the market for physicians' services is increasing: "...there is increasing evidence of competitive behavior, such as the formation of preferred-provider organizations (PPOs), a sharp increase in the growth of enrollment in health maintenance organizations (HMOs), evidence that physician income is level and perhaps falling in some specialties and regions, the movement of physicians to areas where they once declined to work, the steady rise in the rate at which physicians accept assignment on Medicare claims, and anecdotal evidence that physicians coming out of training are taking jobs with lower incomes than their predecessors." (p. 1492)

While the debate continues, we conclude that the market for physicians' services, while not a perfectly competitive one, does exert significant influence on physicians' decisions in setting fees and ordering services. Market competition and utilization review may play a larger role in the future as physician numbers increase, as employers and other third party payors or purchasers of physician services continue to increase their efforts to reduce the costs of providing health insurance or health care for their employees, and if consumers are forced to pay a larger share of the costs of the services they use.

Overprovision and Underprovision

The discussion of incentives affecting patients' and physicians' decisions suggests that the combination of fee for service reimbursement of physician services and complete or near-complete reimbursement insurance under Medicare or other traditional medical insurance might lead to the provision of services with little or no benefit (or possibly harm) to the patient. Similarly, failure to provide services that would be of substantial benefit to the patient reduces quality of care. This section will review the evidence that relates to both issues. The literature provides more evidence relating to provision of services in the fee for service system of little or no benefit than of underprovision of services. This may be because the studies needed to determine the extent of underprovision of services are more difficult to perform and must be based on a population not a patient sample.

The strength of market constraints on physicians' decisions may vary with respect to which services are examined. Patients make greater use of services well-covered by insurance (Newhouse et al, 1981). Inpatient and more technical or surgical services have been more fully covered than outpatient and less technical or cognitive services (this difference in extent of coverage may have narrowed in the last several years). These well covered services, for which increases in physicians' fees or increased use are less likely to increase out of pocket costs to patients, are also the services for which physicians receive higher fees per unit time and effort (Hsiao and Stason, 1978). Most of the studies of use and quality of services in the fee for service system in the U.S. examine surgical and other inpatient services.

We will review the literature on the use of services in the fee for service system. Most of this literature on this subject has been reviewed by Donabedian (1980, 1982, 1985) and summarized by Wyszewianski, Wheeler, and Donabedian (1982). They concluded that "the provision of excessive services and the failure to provide appropriate services have been documented with respect to many aspects of health care delivery." In particular, they state:

- There is excessive use of hospitals--both admissions and days of care per admission--that provide little benefit to the patient.
- There is provision of some surgery that provides little or no benefit to the patient.
- There is excessive use of inpatient laboratory services.
- There is evidence of excessive use of therapeutic services such as injectible drugs (e.g., Brook and Williams, 1976).
- Many studies have shown that a substantial number of the procedures and tests deemed to be necessary were not done.
- The variation in performance among physicians has been found to be substantial.
- A unilateral emphasis on cutting unnecessary services is likely to result in cutting necessary services as well. Therefore, any method for reducing services must be able to discriminate between appropriate and inappropriate services.

An important point obvious from a careful review of the literature is that it is very difficult to develop and apply precise criteria for appropriate use of medical services and quality of care. As Pauly (1979) has pointed out, it is not a simple task to develop a useful definition of "unnecessary" use of medical services, and to determine the extent of such unnecessary use of services.

Studies of hospital services. There are a number of studies of the use of hospital services. These studies used medically defined criteria to judge whether a hospital admission or a particular day during a hospital stay was "necessary" or "appropriate." In some cases the criteria were explicitly defined, in others the criteria represented the implicit judgments of physician reviewers. In the studies reviewed, about ten percent of hospital admissions were unnecessary or inappropriate; and of patients admitted, a percent ranging from about five to thirty percent contained hospital days judged to be unnecessary.

Fitzpatrick et al (1962) reviewed, for a defined set of 18 diagnoses in Michigan in 1958, the hospital records of a large sample of patients. They applied criteria developed by panels of specialist physicians for appropriateness of admission and length of stay. The criteria were based on medical judgment, took into consideration social factors (e.g., decision to discharge depended on facilities in the home), and did not explicitly consider cost. The criteria for justification of admission were relatively restrictive: "It was the intention of the panels to designate that only necessary or required admissions would meet the criteria." (p. 458) Reviews of abstracts and medical records were supplemented by interviews with managing physicians for those cases provisionally judged not to have complied with the criteria, and for a sample of all other cases. The reviewers judged 2.9 percent of the admissions to be inappropriate; of patients discharged alive, 6.7 percent were judged to show overstay and 6.8 percent understay.

Payne et al (1976), using criteria and methods derived from and very similar to those of Fitzpatrick in a large study of hospital admissions in Hawaii in 1968, judged 10.1 percent of admissions to be

inappropriate, and 8.4 percent of admissions to exhibit overstay and 7.6 percent to exhibit understay. Morehead et al (1964), using implicit medical criteria (i.e., the judgments of expert reviewing physicians), judged 15 percent of admissions of Teamsters Union members and their families in New York City in 1962 to be unnecessary.

Gertman and Restuccia (1981) developed explicit, objective criteria for judging appropriateness of hospital admissions and days of hospital care. The criteria were intended to judge an admission or day of care as inappropriate "in the sense that patients receive either services that provide no significant benefit or services that could be rendered in a less costly lower-level institutional or outpatient setting." (p. 855) These criteria were first applied to a sample of 200 hospital admissions to the adult medicine, gynecology, and surgery services in a university hospital. Approximately ten percent of admissions were judged to be inappropriate; days of care were judged inappropriate in more than 25 percent of admissions. They report that preliminary results of a study of 8000 patients in 41 hospitals in eastern Massachusetts show comparable fractions of inappropriate admissions and admissions with inappropriate days of care.

In a subsequent study (Restuccia, Gertman et al, 1984), these criteria were applied to a large number of admissions and almost 5000 days of care for Medicare and Medicaid beneficiaries in 25 hospitals in four geographical regions in the U.S. About 20 percent of admissions and 25 percent of days of care were judged to be inappropriate.

Corder, Lachenbruch, et al (1981) applied explicit criteria for necessary or justifiable services in a study of 50 patients admitted (appropriately) to a university hospital for staging of Hodgkin lymphoma. Services were judged to be necessary if they were required by a staging algorithm, or justified if they resulted from care of a separate medical disorder or from the patient's living at considerable distance from the hospital. For 29 of the 50 patients, more than 30 percent of the bed charges were judged to be neither necessary nor justifiable.

The implicit and explicit medical criteria used in these studies are not easily related to the criteria by which we wish to judge quality of care. Gertman and Restuccia (1981) give a definition of an

inappropriate admission or day of care that seems to be generally representative of the criteria used in the studies undertaken to date. It appears that services are judged inappropriate only if they provide no benefit at all (regardless of cost), or no more benefit than another service less risky or less costly to the patient. This definition would appear to correspond to the absolutist definition or that represented by the private optimum as earlier defined. If so, selective elimination of these services could improve the quality of care. However, Gertman and Restuccia note that using this definition, a rate of zero "inappropriate" services is not a reasonable goal since reduction of "inappropriate" services to zero would also lead to reduction of services beneficial to the patient.

Studies by Fitzpatrick et al. (1962) and Payne et al. (1976) found that the number of admissions that exhibited overstay and understay were roughly equal. The designs of available studies do not allow the determination of the number of admissions which should have occurred but did not. It is thus difficult to determine how often this occurs.

Studies of surgical procedures. The evidence for surgical procedures is similar to that for hospital use. A number of studies conclude that, judged by various medical criteria, some fraction of surgical procedures performed in the fee for service medical system are "unnecessary" or "inappropriate." The criteria used to judge the necessity or appropriateness of surgery are of several kinds. Several studies judged operations that resulted in the removal of only normal tissue to be unnecessary. For example, LoGerfo et al (1979) found that 3 of 15 appendectomies yielded only normal tissue. Sparling et al (1962) found that 30 percent of appendectomies performed in a group of hospitals yielded normal tissue. Unfortunately, we do not know what "correct" rate of removal of normal tissue would result in optimal quality of care; as the fraction of operations which results in the removal of normal tissue falls, the fraction of operations which should have been done but are not may rise (Howie, 1968; Neutra, 1977).

Another body of evidence judged surgical procedures as necessary by implicit or explicit medical criteria analogous to that used in the studies of hospitals. For example, LoGerfo et al (1979) developed criteria for "appropriate" cholecystectomy and hysterectomy, and for

"justifiable" tonsillectomy and adenoidectory (T&A). A cholecystectomy was termed appropriate "if a gallbladder containing stones was removed from a patient of any age with a past history of cholecystitis, or from a patient under 50 years of age even if asymptomatic." An appropriate hysterectomy appears to be one judged by at least two of three board-certified gynecologists to have been "the most appropriate" form of treatment for the patient whose care was reviewed. Examination of 97 T&As, 56 hysterectomies, and 24 cholecystectomies in a set of fee for service practices resulted in the labeling of 66 T&As as unjustified, and 12 hysterectomies and 2 cholecystectomies as inappropriate.

The experience of second opinion programs for elective surgery provides additional evidence of surgery judged not "necessary" by clinical criteria. McCarthy et al (1981) reviewed the experience of several mandatory second opinion programs for elective surgery in New York City in the 1970s. They report that about 20 percent of 6800 recommended elective surgery procedures were not confirmed as necessary for the patient, in that the consultant found that the proposed surgery did not meet the criteria that "surgery is warranted and appropriate and that the operation is in the best interests of the patient." (p. 34) The wording of the criterion suggests that the consultant should advise against surgery unless he has "no doubt" that it should be performed; these criteria are perhaps stricter than most. In addition, surgery which should be delayed until a later time was considered to be not confirmed upon second opinion, though it may be later considered necessary. Martin et al (1980) report similar results of another mandatory second opinion program.

We do not know how often the second opinion is wrong; some patients obtain a third opinion that disagrees with the consultant. Some patients elect to have surgery not recommended by the consultant. It is difficult to conclude just how much of the surgery that is not confirmed (or that which is confirmed) is unnecessary by clinical criteria. These studies, however, support the conclusion that some elective surgery is not necessary by medical criteria; how much is unnecessary is not clear. Neither these studies nor those reported above yield information on the number of surgical procedures that should have been done but were not.

The evidence suggests that, like the use of hospitals, there are surgical procedures performed that have little or no benefit for the patient. Because surgery involves significant risk to the patient (perhaps more than an extra day in the hospital), such surgery lowers quality of care. We do not know how much surgery is "unnecessary," nor do we know how much this surgery could be decreased without also reducing the amount of beneficial surgery which is foregone. We do not know how much "necessary" surgery is not performed.

Studies of laboratory tests. There are many studies suggesting that some laboratory tests in teaching hospitals provide little or no expected benefit to the patient (e.g., see Griner and Liptzin, 1971; Cummings et al, 1982; Myers and Schroeder, 1981; Williams, Eisenberg, et al, 1984; Corder et al, 1981). There is less evidence on the use of laboratory tests in non-teaching hospitals. Although an analysis of financial incentives suggested that outpatient laboratory tests would also be overused (Schroeder and Showstack, 1979), the evidence does not support this conclusion (Epstein et al, 1984; Manning, 1983).

The Rand Health Insurance Study. The Health Insurance Study is a large experiment designed to investigate the effects of patient cost-sharing under fee for service care, and of care in prepaid group practice, on health status and the use of medical resources. (See Newhouse et al, 1981, for a description of the study; a number of publications describing the results of the study will be cited below.) The results of the HIS provide additional evidence on the influence of extensive insurance coverage on use of services, and the relationship between levels of use and quality of care in the fee for service system:

- Adults who shared in the costs of medical services received care costing less than those receiving free care, had fewer outpatient visits, and were hospitalized less often; yet the average adult had health status outcomes nearly indistinguishable from the group receiving free care (Newhouse et al, 1981; Brook et al, 1983). This suggests that the services foregone by adults whose plans required cost-sharing would have provided little marginal benefit to those patients.

Cost sharing led to a reduction of outpatient visits for children in families whose insurance plans required cost sharing, but hospitalization rates for children were not affected (Leibowitz et al, 1985). Within the limits of the duration and health status measures used in the study, the lower use of services by children in families with cost sharing compared to free care had no significant effect on health status (Valdez et al, 1985).

- Poor people who entered the study at higher risk of ill health due to preexisting conditions showed a statistically significant benefit from free health care for hypertension and vision. This suggests that at least some poor sick people can benefit from additional care.

These findings suggest that the additional services provided in the free fee for service plan had little or no benefit for the average person. The extent of insurance coverage for most of the U.S. population is well below that of the free care plan and comparable to the intermediate cost sharing plans (Newhouse et al, 1982, p. 12 and Appendix B). Increasing the services these people use would likely not increase either quality of care or health status.

Those who were poor and sick did benefit from additional care in the Health Insurance Study. Furthermore, the amount of cost-sharing in the experimental plans was scaled to family income; i.e., the amounts paid were lower for poorer families. Poorer families in the general population would be expected to have health insurance with less extensive coverage and higher cost-sharing than in the Health Insurance Experiment. A reduction in care for the poor and sick would be likely to adversely affect health.

Other Studies. Several studies suggest that intensive care services in hospitals could be reduced without an adverse effect on the health of persons now receiving these services (Knaus et al, 1983; Mulley et al, 1980; Singer et al, 1983; Strauss et al, 1985).

There is a great deal of variation in the use of services under the present Medicare system for what appear to be comparable populations (Wennberg et al, 1982; Roos et al, 1977; McPherson et al, 1982; Brook et

al, 1984). These studies have been interpreted to suggest that much of the variation will be unrelated to patient outcome and represent services for which the benefits are minimal. Underutilization and inappropriate utilization of services, also appear likely. Thus, it is unknown whether variations in use of services by populations represent overuse, underuse, or both. At least one study to examine the clinical import of these variations in rates of use of services by the Medicare population is in progress (Brook et al, 1984).

Finally, data from the Professional Standards Review Organization (PSRO) program indicate that deficiences in quality of care can be corrected by quality assurance mechanisms (American Association of Professional Standards Review Organizations, 1981). In addition, such a program appears capable of paying for itself when coupled with a utilization review activity (Health Care Financing Administration, 1980).

Recent Changes

In the past several years, there has been a great deal of change in medical care in the U.S. including the institution in 1984 of Medicare's Prospective Payment System for paying for hospital care. There has been a significant drop in the number of hospital admissions and the average length of stay of those admitted. The number of admissions to acute care hospitals of persons 65 and over increased by 4.7 percent from calendar 1982 to 1983, but decreased by 2.9 percent from 1983 to 1984. Similarly, inpatient days increased by 0.1 percent from 1982 to 1983, and decreased by 10.2 percent from 1983 to 1984 (American Hospital Association, 1985). Surgical and other procedures that were performed in the hospital have been shifted to the outpatient setting (Carter and Ginsburg, 1985).

We do not know how these changes have affected quality of care. It is reasonable to believe that unnecessary admissions and hospital days have been reduced, that surgical and other procedures that were performed in the hospital have appropriately been moved to the outpatient setting, and that use of unnecessary drugs and tests in the hospital have decreased. It is also likely that some, or even many, patients have been denied services for which benefits were likely to

exceed patient and social costs, and that quality of care has fallen. We do not yet know whether PPS can selectively reduce unnecessary services without reducing needed use as well.

HEALTH MAINTENANCE ORGANIZATIONS

We review the experience with HMOs because they represent the only alternative to fee for service medical care in the U.S. for which there is a significant body of evidence on quality of care. Several definitions or concepts of "health maintenance organization" exist (Wolinsky, 1980). Luft (1981) lists five key features of the HMO concept.

- The HMO assumes a contractual responsibility to provide or assure the delivery of a stated range of health services. This includes at least ambulatory care and inpatient health services.
- The HMO serves a population defined by enrollment in the plan.
- Subscriber enrollment is voluntary.
- The consumer pays a fixed annual or monthly payment that is independent of the use of services. (However, minor charges may be associated with a visit.)
- The HMO assumes at least part of the financial risk or gain in the provision of services.

This definition encompasses a number of types of organizations which differ in features thought to be important for determining the quality of care provided by the HMO (Wolinsky, 1980; Hornbrook and Berki, 1985). Though there are risks of oversimplification (Wolinsky, 1980), we will focus on two forms of HMO: the prepaid group practice and the independent practice association (IPA).

The most frequently evaluated form of the prepaid group practice form of HMO in the literature is exemplified by the large, nonprofit, multispecialty groups of salaried physicians who care only for the HMO's enrollees. The modal form of an IPA is a loose federation of independently practicing physicians paid fee for service by the contracting HMO, with HMO patients constituting only a fraction of each physician's practice.[1] These two forms do not account for all HMOs, and

[1] Independent Practice Associations often pay physicians fee for service. They may have utilization controls that are absent from fee

there is considerable variation within each of these two categories. In addition, the traditional forms of an HMO may represent a smaller proportion of newer HMOs. However, most of the available literature relates to these two traditional HMO forms.

Incentives

Whether economic theory predicts that HMOs would provide medical care for their enrollees that costs less than that provided in the fee for service sector is a controversial issue (Luft 1981, ch.2; Pauly 1980). Financial incentives may influence an HMO to withhold needed services, but this may be countered by the physicians' medical ethics, the plan's need to compete with other providers for enrollees, and the threat of malpractice litigation.

The financial risk assumed by the HMO can be shared by the three major parts of the HMO: the plan that contracts with the enrollees, the physicians who provide medical services, and the hospital(s) that provide inpatient non-physician services. In both prepaid group practices and IPAs, the individual physician may be at some financial risk for his patient care decisions.

The financial incentives experienced by the physicians who provide medical services to HMO enrollees vary among HMOs. Many physicians in prepaid group practices are paid by salary and so have no direct incentive to provide additional services for each patient. (There may be an indirect incentive through the expectation of raises.) In addition, in some prepaid group practices the income of the physician group or individual physicians is reduced if expenditures exceed a budget. Most physicians in IPAs are paid by fee for service, so, like physicians paid fee for service outside HMOs, they have a financial

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for service medicine. They seem to represent an intermediate form of practice, between traditional fee for service and a prepaid saleried HMO, but the evidence reviewed suggests that they usually provide services in much the same way as the rest of the fee for service sector. In a few instances they appear to function more like prepaid group practices. Most IPA's have included all physicians in an area such as a county. If a consumer leaves an IPA, he generally is cared for by the same set of physicians; unlike a member leaving a prepaid group practice, he is not lost as a patient. Newer IPAs may differ considerably from the county medical association model of an IPA. We have little empirical evidence on the quality of medical care from IPAs.

incentive to increase personal income through provision of additional services. IPA physicians may be subject to fee or income reductions if expenditures exceed a target.

Physicians in HMOs operate under more organizational controls than do solo fee for service providers (Wolinsky, 1980; Luft, 1981; Wyszewianski, Wheeler, and Donabedian, 1982). Both prepaid group practices and IPAs may have peer-review mechanisms that not only work to control utilization but perhaps also to improve quality of care. Practicing in prepaid groups may encourage internal communication and mutual education. These mechanisms, however, are not unique to HMOs. Physician groups in the fee for service sector may also provide peer review, and Peer Review Organizations provide review for care of all hospitalized Medicare patients. However, if peer review mechanisms realize their potential for improving quality of care, their more widespread use in HMOs than in fee for service may provide an advantage to HMOs.

The HMO may directly constrain the provision of physician and other services to members through several mechanisms, including controls on the availability of hospital beds and consultant physicians, and through utilization review of physicians. These controls on utilization may be as important as the way physicians are paid in determining what services are provided to patients (Meier and Tillotson, 1978).

The incentives to minimize costs of care in HMOs may result in withholding services that would provide benefits to patients. The quality of care provided in HMOs may be better than from fee for service providers if HMOs provide needed services and do not provide services that have expected risks and costs greater than expected benefits. Quality of care in HMOs may be lower than in fee for service if HMO providers delay or withhold needed services.

Quality and Cost

Care in general. Luft (1978a, 1978b, 1981, 1982) has provided a detailed critical review of the literature on HMO performance through about 1980. Nearly all of the evidence available at that time derived from non-experimental studies. This evidence is subject to bias from self-selection of both beneficiaries and physicians. Luft was aware of these biases and attempted to take their effects into account (Luft,

1981, Chapter 3). He carefully evaluated the existing evidence on HMO performance, including use of services and costs of care, and the quality of care. He reached the following conclusions about the performance of HMOs and fee for service care for apparently comparable beneficiary populations.

- Compared to the fee for service sector, prepaid group practice HMOs provide care at a lower cost per enrollee; the evidence does not allow the firm conclusion that costs are lower in IPAs. The lower cost in prepaid group practice HMOs is generally accounted for by fewer hospital admissions than for IPAs and populations served by fee for service providers; IPAs may have lower hospital utilization than fee for service. Lengths of hospital stay are similar for prepaid group practices, IPAs, and fee for service. The number of outpatient visits is similar for prepaid group practices and fee for service; IPAs tend to have a higher rate of ambulatory visits. Some HMOs provide more preventive services (e.g., immunizations, prenatal care, screening tests such as Pap smears, physical exams) than fee for service providers. Luft attributed this to the more extensive insurance coverage for these services in HMOs than in most fee for service plans, rather than to a specific intent to provide more preventive services by HMOs (Luft, 1978b).
- On the basis of examination of structure, process, and outcome measures of quality of care, the evidence supports the conclusion that the quality of technical care in HMOs is not distinguishable from that in fee for service medicine.
- Members of prepaid group practices are generally more satisfied with the out of pocket cost of their medical care[2] and less satisfied with interpersonal aspects of care than fee for service comparison groups. The two groups are about equally satisfied with the technical quality of their care.

[2] The lower total costs of care in prepaid group practice-HMOs are not always directly experienced by those enrolled in the plans, as some employers pay the total costs of the plan chosen regardless of its cost.

These differences in consumer satisfaction are what one might expect between a system which rations services in part through patient costs for services (fee for service) and one which generally eliminates financial barriers to care but rations care through constraints on physician behavior (HMO). Most plans are gaining subscribers, which suggests that for a substantial number of consumers, the advantages of prepaid group practice care outweigh the disadvantages.

- Some HMOs have served the poor effectively, but there is potential for problems. HMOs have generally provided care for relatively young, healthy, employed populations. The elderly poor, and the elderly population generally, have different medical and social needs from those of employed populations and Medicaid beneficiaries. They more frequently suffer from chronic illness, and they more often have motor or sensory impairments that may affect their ability to cope with a large bureaucracy. There is little specific evidence upon which to predict how well HMOs can serve the elderly population. However, when large numbers of California Medicaid beneficiaries were enrolled in Prepaid Health Plans in the 1970s, there were instances of reduced access to services and of poor quality of services received (Louis and McCord, 1974; D'Onofrio and Mullen, 1977). Some of these plans were started solely to care for Medi-Cal beneficiaries; some engaged in deceptive marketing and enrollment practices. The legislation enabling the enrollment of Medi-Cal beneficiaries in Prepaid Health Plans provided for minimal regulation of the ownership, organization, and operation of the Plans. There was little provision for monitoring performance or quality. This experience suggests that such safeguards will be important if similar experiences are to be avoided if large numbers of Medicare beneficiaries are enrolled in prepaid health care organizations.
- The performance of some fee for service groups may be more nearly comparable to that of prepaid group practices than to that of solo fee for service providers. This observation

raises questions about the effects on quality of group practice versus solo practice as opposed to physician payment in determining differences in use and quality of care.

There is conflicting evidence as to the strength and types of influence of group practice on "practice style" (Hornbrook and Berki, 1985). Roos (1980) found no differences in quality of care between group and solo physicians. Other studies have found differences in utilization patterns between physicians practicing in groups versus solo, but no clear implications for quality of care were evident (e.g., Epstein et al, 1983; Wolinsky and Marder, 1982; Hornbrook and Berki, 1985).

Other reviewers have reached some of the same conclusions. Cunningham and Williamson (1980) critically reviewed the published results of 27 studies comparing quality of health care in HMOs, primarily prepaid group practices, to that in fee for service settings. They concluded: "... within the limitations of the populations studied, there is little question that facility-based HMO care is at least comparable to care in the non-HMO setting." Wyszewianski, Wheeler, and Donabedian (1982) conclude that the quality of technical care is comparable in prepaid group practices and fee for service settings.

Wolinsky (1980) agrees with other reviewers that prepaid group practices provide care of lower cost than fee for serive providers for apparently comparable populations. He appears to agree that quality of care is roughly comparable in prepaid group practices to that in fee for service medicine. He stresses that we do not yet understand how these results are achieved. In particular, we do not understand the separate effects of differences in organization, incentives facing patients, financial and other incentives facing physicians, and differences in the populations served.

The results of the Rand Health Insurance Study (HIS) generally confirm the results of the nonexperimental literature. The HIS randomly assigned a group of 1580 persons to receive care free of charge from a fee for service physician of their choice or to a prepaid group practice (Manning et al, 1984). A group of 733 persons already enrolled in the prepaid group practice served as a control group. The cost of care for both of the prepaid group practice groups was about 25 percent below

that of the group receiving free care from fee for service providers; the rate of hospitals admissions was about 40 percent less, with a similar average length of stay of persons admitted. Both medical and surgical admissions were lower in the HMO (Leibowitz, 1983). Ambulatory-visit rates were similar in the three groups, although the number of preventive visits was higher in the prepaid group practice. Persons randomized to the prepaid group practice were generally less satisfied with their care than those randomized to fee for service care; however, those in the control group already enrolled in the prepaid group practice were as satisfied with their care as those in the fee for service group (Davies, 1983).

There is little information available about the quality of care provided to the Medicare population in HMOs; few Medicare beneficiaries are served by HMOs, and most of the available evidence is drawn from studies of other populations. An evaluation of the quality of care received by Medicare beneficiaries in Medicare HMO demonstrations is currently in progress (Rossiter, Friedlob, and Langwell, 1985).

Care of specific conditions. Several studies that examine care for a specific diagnosis and that attempted to study comparable populations receiving care from fee for service providers and HMOs will be discussed in detail because the focus on management of specific illnesses might more easily uncover any tendency for HMOs to skimp on services, particularly hospitalization, surgery, and other expensive services.

LoGerfo et al (1979) examined surgery performed in a large prepaid group practice and that done by a number of fee for service providers in the Seattle Prepaid Health Project. They applied specific criteria to determine whether each of the surgical procedures was "necessary, appropriate, or justifiable" as discussed earlier. They judged that 22 percent of the prepaid group practice cases examined did not meet the criteria for surgery compared to 43 percent of the fee for service cases, suggesting the prepaid group practice performed less unnecessary surgery. However, since the rate of surgery in the fee for service sector was 3.9 times higher than in the prepaid group practice (after adjustment for differences in the populations served), they concluded that surgery may be underprovided in the latter group.

In another study from the Seattle Prepaid Health Care Project, LoGerfo et al (1978) assessed the quality of care for patients who present with a urinary tract infection. The process of care, particularly the appropriate use of urine cultures, was of higher quality in the prepaid group practice than in fee for service sector.

Quick et al (1981) compared prenatal care and pregnancy outcome in 1973-74 for over 4000 deliveries by enrollees of the Kaiser-Permanente Medical Care Program with 19,000 deliveries by fee for service physicians to a comparable population. They found that HMO members began prenatal care on average one month later and received fewer prenatal visits than the population cared for by the fee for service providers. However, pregnancy outcome as measured by prematurity, and neonatal and infant mortality rates, did not differ between the two populations. Another study of the quality of maternity care provided to patients of an HMO and a group of private fee for service patients in Boston revealed little or no difference in the process of prenatal care or the outcome of pregnancy (Wilner et al, 1981).

Francis et al (1984) compared care in King County, Washington, of 39 patients with colorectal cancer in a prepaid group practice, to 150 patients receiving fee for service care. No differences in outcome were seen, including survival at four years and health status at one year. The treatment given the two groups of patients was comparable once the diagnosis was made. There was a statistically significant difference in the interval between first contact with a physician and initiation of treatment: the median interval was 47 days for patients in the HMO and 14 days for those in fee for service. Although the reason for the delay in the HMO is not clear, the authors suggest it may be due to a hesitation by HMO physicians to vigorously pursue the cause of the presenting symptoms.

PHYSICIAN SPECIALIZATION AND QUALITY OF CARE

Medicare generally pays a higher fee to specialists than to less specialized physicians for similarly coded services. There are proposals to narrow or eliminate the differences between fees paid specialists and generalists for apparently similar services (e.g., an

office or hospital visit, or reading an electrocardiogram). If this were done, there might be changes in the amounts and kinds of services patients receive from specialists (see the next section).

Is there a basis for paying a higher fee to a more specialized physician for a given type of service? For example, should a cardiologist be paid more than a general internist, a family practitioner, or a general practitioner for interpreting an electrocardiogram? For the management of care of acute myocardial infarction in a coronary care unit? For an office visit for a urinary tract infection? For counseling a patient about an emotional problem?

The literature provides some basis for addressing these questions. It is first useful to clarify what is meant by a specialist and generalist. Several decades ago, there were large numbers of general practitioners who usually had only one year of graduate medical training (after medical school). More specialized physicians included pediatricians, internists, surgeons, and subspecialists such as cardiologists or cardiothoracic surgeons. The numbers of general practitioners as defined above have declined. Most graduates of American medical schools in the past two decades have pursued several years of graduate training, usually leading to eligibility for certification by specialty boards.

The specialties for which physicians train and for which board certification is available include Family Practice. Family practitioners have in part replaced general practitioners as family-oriented primary care physicians. They provide primary care as do other physicians with comparable periods of postgraduate training: pediatricians, general internists, and others. Many more physicians now complete more advanced training in subspecialties of internal medicine, surgery, pediatrics, and other areas. The meaning of "specialist" has changed.

What can we say about quality of care given by a more versus a less specialized physician? There are many studies, sometimes conflicting, demonstrating differences between the characteristics of care given by physicians of several specialties (e.g., Rosenblatt and Moscovice, 1984; Rothert et al, 1984; Goldberg and Dietrich, 1985; Kissick et al, 1984; Mendenhall et al, 1984; Noren et al, 1980; Greenwald et al, 1984;

Eisenberg and Nicklin, 1981). The implications of these differences for quality of care are not clear, though many have clearer implications for cost of care.

Several studies in the 1950s found that completion of additional years of training beyond medical school was associated with better quality of care by general practitioners (Peterson et al, 1956) and family physicians (Morehead, 1958). More recent studies have clarified the relationship between quality of care and specialization or postgraduate training. Studies by Payne and colleagues introduced the concept of the "modal specialist." A modal specialist is a specialized physician practicing within the domain in which he has received advanced training (Payne et al, 1976). For instance, a cardiologist is practicing within his domain when caring for a patient with a myocardial infarction, but outside his domain when caring for a patient with a urinary tract infection. In Payne's studies, a general practitioner is not considered to have a particular domain.

Payne and colleagues have examined the relationship between specialization and quality of care in several studies. These include a study of over 2500 patient-episodes of care (combined inpatient and outpatient) requiring hospitalization by physicians in Hawaii in 1968 (Payne et al, 1976; Rhee, 1976; Rhee et al, 1981) and a later study of more than 1000 physicians providing ambulatory care to over 6000 patients (Payne, Lyons, and Neuhaus, 1984). In both studies, the following relationships were found between specialization and quality of care provided by physicians.

- More years of postgraduate training (usually characterized as eligibility for specialty board certification) was associated with better performance of the physician.
- Board certification *per se*, as opposed to years of postgraduate training or board eligibility, was not associated with improved physician performance.
- Specialists practicing within their domains (modal specialists) performed better than specialists practicing outside their domains, and better than generalists (unspecialized physicians) who practiced without restriction and for whom no domain was specified.

Other studies also found a positive relationship between specialization and quality of care given by a physician in ambulatory care (Riedel and Riedel, 1979) and hospital care (Morehead, 1964).

CONCLUSIONS

Fee for Service

The literature reviewed supports the conclusion that, under cost-based retrospective reimbursement for hospital services for Medicare patients and Medicare's "customary, prevailing, and reasonable" method of fee for service reimbursement of physician services, there was significant provision of services with little or no net benefit to the patient, particularly in the inpatient setting. Although the evidence is scanty, there also appears to be underprovision of services with ill effect in both inpatient and outpatient care.

Effective preventive services such as immunizations and mammographies are underused. Doctors do not counsel patients about stopping smoking as often as they should; and many patients with controllable chronic diseases, e.g., hypertension, are not receiving adequate care.

There are several features of the fee for service system that might relate to the nature of the care provided in the system. Physicians are paid a fee for each unit of service. Widespread reimbursement insurance exists for most services. This reduces the degree to which patients and their physician agents are sensitive to the costs of the resources used. There is little restraint of utilization of services by third parties and almost no effort devoted to quality assurance. Finally, the relative fees paid for physicians' services appear to embody several distortions.

It is not generally possible to state with confidence which services are over- or underutilized in fee for service medicine. At best, the literature provides evidence as to which services are more likely at the margin to provide little or no benefit to patients receiving them. Economic theory and the evidence tends to support the prediction that inpatient services and surgical and technical procedures are more likely to have little marginal benefit than other services

provided in the fee for service sector. However, there is also evidence that patients failed to receive services for which benefits would clearly have exceeded costs.

Health Maintenance Organizations

The evidence examined supports the conclusions that the HMOs studied, particularly traditional prepaid group practices, can provide medical care of technical quality roughly comparable to the fee for service medical care sector, and can do so at lower cost. There is some indication that consumer satisfaction may on average be lower in HMOs than in the fee for service sector.

The lower cost of HMO care is due to a lower rate of admission to hospital, with similar length of stay for those admitted, and with comparable numbers of outpatient visits. There is considerable variation in quality of care within the fee for service sector and among HMOs. There is some evidence that the care provided by multispecialty fee for service groups is generally comparable in quality to that of prepaid group practices, but, again, the variation within each category is large. The traditional IPAs generally provide care of similar style, cost, and quality as that in the non-IPA fee for service sector.

If one concludes that HMOs, particularly traditional prepaid group practices, can provide care to their members that is of essentially the same quality (and less expensive) as that provided in the fee for service sector, it is nevertheless unwarranted to assume that extending HMO care to a much larger fraction of the population and particularly the elderly will result in comparable quality of care (at a lower cost). Newer organizations may differ considerably from the traditional prepaid group practices previously studied. Also, admission rates in fee for service medicine have recently fallen, possibly eroding the advantage of HMOs.

One other point bears consideration. A relatively small fraction of physicians practice in a prepaid group practice setting. It may be that the conditions and style of practice in HMOs provide an environment in which the bulk of physicians cannot function as well as those who are already in HMOs.

Specialization and Quality of Care

Studies provide some support for the position that specialty training is associated with improved quality of both ambulatory care and hospital care when the specialized physician is practicing within the domain in which he has received advanced training. The evidence that physician performance is improved by specialization *PER SE* is weaker. Designing a physician reimbursement system to implement these findings would be difficult to do; however, an organization such as a medical staff or an HMO could take advantage of these findings by making sure that a patient with a specific set of signs and symptoms would see a physician who was trained in the appropriate area. The reason why some HMOs can deliver the same level of care as do fee for service providers may be directly related to their ability to perform this triage function.

Policy Considerations

A blunt policy instrument is likely to reduce the quality of some aspects of medical practice as it improves others. An intervention that works to reduce unnecessary services is likely to reduce some necessary services as well. We shall examine several alternative payment schemes in an attempt to anticipate their effects on quality of care. It must again be emphasized that we know very little about the effects on quality of care of either current ways or alternative ways of paying for physicians' services.

If changes are made in the way Medicare pays for physicians' services, it is very important that quality of care be monitored in order to ascertain the effects of the changes. It may be best to pursue this evaluation as part of a rigorously designed experiment so that solid and defensible answers can be obtained.

IV. IMPLICATIONS FOR QUALITY OF CARE OF ALTERNATIVE PHYSICIAN PAYMENT SCHEMES

The analytic framework and the literature review provide a basis, though limited, for anticipating the effects of changing the way Medicare pays for physicians' services. It is not possible to predict with confidence the effects of each alternative physician payment scheme on quality of personal health care. This analysis and examination of a number of illustrative patient examples will, however, indicate where important effects on quality of care can occur. We will then indicate how one might monitor quality of care if an alternative system for paying for physicians' services were adopted.

ALTERNATIVE PAYMENT SCHEMES

The alternative payment schemes represent a variety of approaches under consideration by policymakers. They differ in the incentives they offer the physician, the way services are packaged for payment, who receives the payment, the relative and absolute amounts paid and how that is determined, how and by whom financial risk is borne, the organizational setting in which care is provided, and accompanying constraints on physician or patient behavior. The alternative schemes to be considered are:

1. *Fee for service with an explicit fee schedule determined by some means other than customary or prevailing mechanism* (e.g., by negotiation or by competitive bidding). We will not precisely specify how the fee schedule is determined, but will assume that the schedule reduces the differences between fees for specialists and generalists for similar services (e.g., an initial office visit); reduces the difference for the same service when performed in the hospital or outpatient setting; reduces the difference in per hour compensation for surgical procedures relative to medical procedures, and for "technical" procedures such as endoscopy relative to more "cognitive" services such as a history and physical. We will also assume that: (1) utilization review is explicitly extended to inpatient physician services; (2) that

Medicare maintains a "participating physician program" that makes available to Medicare beneficiaries information about which physicians have agreed to take assignment on all cases; (3) and that Medicare covers comparable inpatient and outpatient services equally so that patients and their physicians are not encouraged to use more expensive inpatient services over comparable outpatient services.

2. *Physician inpatient DRGs.* The unit of service includes all physician services associated with a hospitalization, but excludes hospital costs (room and board) and all ancillaries now included under hospital DRGs. Reimbursement for physician services provided outside the hospital would be on a fee for service basis using the present system or a fee schedule as outlined in 1. above. Hospitals would be reimbursed through the current DRG system. The physician DRGs would be reimbursed using the same disease categories used for hospital DRGs. Three versions of this system will be considered:

a. The recipient of the payment is the attending physician, who contracts with consulting physicians, if necessary, for their services. This would be applied to all DRGs but risk would be limited, for example, by a liberal definition of outliers or by blending fee for service and per-admission payments (see below). Assignment would be mandatory because case-by-case assignment is not workable under this system. (Physicians would be inclined to accept assignment on all cases in which they anticipated costs below the DRG reimbursement level and refuse assignment for cases with higher expected costs. The physician would receive an extra payment over costs in cases where costs were below the DRG reimbursement level while patients would bear the burden of costs above the DRG reimbursement level.)

b. Same as a., but no mechanism applied to limit financial risk to the attending physician.

c. The recipient of the payment is the medical staff, which decides how to distribute payments among staff physicians. Payment may be allocated to each physician by his contribution to total services which is defined by accumulated "shadow fees" (his total allowable fees charged prior to adjustment; Jencks and Dobson, 1985). Assignment would be mandatory at the level of the hospital staff, or perhaps a "participating medical staff" arrangement would be feasible in some instances.

3. *Increasing the enrollment in HMOs* by any of several mechanisms. Medicare could make the conditions of participation for HMOs more favorable, or a prepaid care plan similar to those proposed by Enthoven (1978) or McClure (1982) could be adopted.

4. *Geographic capitation* of all part B expenditures (physician services) both in and out of hospitals -- the carrier-at-risk model (Wallack, 1985). The carrier would have several options for how to pay for physicians' services including fee for service using a national relative value scale, or through HMOs.

5. *Lump sum payment for a package of ambulatory services* (a visit or an illness episode).

6. *Lump sum payment for therapeutic procedures* such as lens extraction (cataract surgery).

ANALYSIS OF SELECTED SCHEMES

Each of the alternatives to be examined provides a fixed payment for each unit of services provided (e.g., an office visit under fee for service, all physician services for an inpatient episode under physician DRGs). This provides the following incentives to the physician or other entity (e.g., the HMO) at financial risk:

- To produce at minimum cost each unit of service such as a diagnostic workup of a given level of quality (clinical efficiency);
- To purchase each input to production such as laboratory tests or office nursing time as inexpensively as possible given the quality of the input;
- To substitute inputs paid for by others for those paid for by himself;[1] for example, to substitute hospital laboratory tests paid for by the hospital for his own time under physician DRGs;

[1] Assuming that this does not in turn affect the demand for his services; see Pauly (1980) for a model in which increasing the amounts the patient must pay for non-physician services reduces the amount the physician can obtain for his own services.

- Within the limits of outside constraints (utilization review, ethical norms, threat of malpractice, and competition in the market for physicians' services), to reduce the quality of the service (when that leads to cost savings) by reducing or omitting services within the unit; for example, to forego a useful diagnostic procedure for a patient.

These principles, derived from our framework in Section II, can be applied to each payment scheme to predict its effect on physician decisions and the structure, process, and outcome of care.

Fee For Service with Different Fee Schedule

Current Medicare prevailing fees are generally higher for similar services rendered in the hospital than in the ambulatory setting, for more technical procedures and surgery than for less technical services, and for similar services provided by more specialized than by less specialized physicians. If these fees were changed to narrow those differences, fees would increase relatively for outpatient services; less technical services such as time spent examining the patient, determining a course of management, and counseling the patient; and services from less specialized physicians. Fees would decrease relatively for most inpatient services; technical procedures such as endoscopy and surgical services; and services from specialists. Physicians whose practices tend to consist of services for which fees would increase[2] would include general practitioners and family practitioners and general internists. Physicians whose practices tend to consist of services for which fees would decrease would include surgeons, particularly those who spend a large fraction of time in surgery rather than in diagnosing and counseling patients; subspecialized internists, particularly those whose practices are more hospital-centered or who spend a large fraction of time doing technical procedures; and hospital-based physicians (e.g., pathologists, radiologists, anesthesiologists). Physicians would have a personal

[2]We will assume for this analysis that absolute changes in fees are similar to the relative changes in fees.

financial incentive to provide more outpatient and nontechnical services to Medicare patients at the expense of inpatient and technical services.

These changes in fees would result in higher patient out-of-pocket costs for inpatient and technical services and for services from specialists. This assertion is based on the assumption that some physicians will refuse assignment and some Medicare beneficiaries will not purchase complete "Medigap" insurance to cover coinsurance and deductibles; that Medicare beneficiaries are sensitive to out-of-pocket costs, and physicians are sensitive to the financial return they receive for various services. With these assumptions, the net effects of these changes on use of services by Medicare patients can be summarized as follows. Compared to patterns of care under the present Medicare payment system:[3]

- Patients will use more outpatient services and will be less frequently hospitalized and use fewer inpatient services; services of all kinds will tend to shift to the outpatient setting;
- Patients will use fewer surgical and technical procedures, and increase their use of less technical or "cognitive" services such as physician visits and counseling time;
- Patients will be less likely to receive a given service from a specialized physician than before;
- The mix of services provided by each type of physician will shift toward more outpatient and nontechnical services and fewer inpatient and technical services; for example, when possible, surgeons will be less likely to operate on a patient and more likely to spend time counseling the patient;[4]

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[3] Because fees increase for outpatient and nontechnical services, physicians would be more willing to accept assignment for these services. Nonspecialist physicians, who tend to provide more outpatient and nontechnical services, would be more willing to accept assignment than would specialists. Patients face more out-of-pocket costs from physicians refusing assignment. The predicted utilization changes would be mitigated by decreases in charges for inpatient, technical services and of specialist physicians due to competition for patients (assuming patients are sensitive to price differences among physicians). However, differences between charges of generalists and specialists would remain for many services, especially if other payors do not change fees in the same way Medicare does.

[4] Though specialists may attempt to increase the number and

- Unless the pattern of supplementary insurance (including Medicaid) offsets it, these results will more likely occur among poorer Medicare patients because out of pocket costs will probably cause a greater response there; for example, when compared to the current situation, poorer patients will be less likely to be cared for by specialists or to receive technical procedures than well-to-do patients.

Patient examples. How will these changes in use affect quality of care? We will illustrate the effects on quality of care by predicting the changes in care received by several hypothetical patients intended to be representative of the Medicare patient population. These patients will be "introduced" here. A brief description of each patient is in the Table of Patient Examples. We will return to them as we examine effects of other payment systems on care.

P.U. is a 66 year old man in good general health, but is troubled by known peptic (duodenal) ulcers. He has adequate money put away for retirement, but still has to watch his expenditures: he tries to buy only what he needs. He has no supplementary insurance to pay any out-of-pocket costs. How might his management differ under the revised fee for service system? First, he is more likely to seek care from a less specialized physician (family practitioner) because of an increase, if he went to a gastroenterologist, in out of pocket costs. The diagnostic workup is likely to be less extensive because it is being directed by a less specialized physician and because there are significant out-of-pocket costs for procedures such as endoscopy. He is more likely to be managed medically (diet, antacids, drugs) than with surgery because he is less likely to have sought care from a surgeon or to accept referral to a surgeon. He is less likely to be hospitalized. He is likely to do well. If he eventually needs surgery, there will have been a longer period of symptoms prior to surgery and surgery may need to be done as

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complexity of services they provide (Gabel and Rice, 1985; Rice and McCall, 1982), their ability to do so would be limited by hospital peer review and by the sensitivity to out-of-pocket costs of patients and their physician agents (specialists will still be higher-priced and will be accepting assignment less often).

Table of Patient Examples

P.U., a 66 year old man with peptic ulcers but otherwise in good general health; he has moderate financial resources

G.C., a 66 year old otherwise healthy man who has symptoms which suggest peptic ulcers, but in fact has carcinoma of the stomach

L.H., a 67 year old man with a large inguinal hernia, a history of myocardial infarction, mild congestive heart failure, and moderate chronic obstructive lung disease; he has few financial resources

H.J., an 83 year old woman in generally good health who has a bad hip joint which needs to be replaced

D.M., a 65 year old man with insulin dependent diabetes mellitus, heart disease with angina; he is beginning to have problems with his feet (e.g., infections) due to the diabetes; if the diabetes is not carefully controlled and good foot care maintained, he may lose his feet to amputation; he is financially secure

A.M., a 68 year old man with acute myocardial infarction and serious arrhythmias; he needs skilled intensive care to minimize the risk of sudden death

L.T., a 69 year old man with a malignant tumor of the lip; his financial resources are meager; personal appearance is very important to him, so he very much wants the best surgical care from a skilled plastic and reconstructive surgeon

R.A., an 80 year old woman with poor hearing and eyesight, whose worsening rheumatoid arthritis threatens to force her to leave her home for a nursing home

C.C., a 72 year old woman with apparently localized colon carcinoma requiring surgery; her diabetes, kidney disease, and heart disease make her a high surgical risk

I.L., a 67 year old man awaiting removal of his second cataractous lens with implantation of an intraocular lens

an emergency (i.e., when the patient is bleeding). If he does not need surgery, the costs of his care to him and to Medicare may have been lower than under the current system. The quality of his care and his outcome are likely to be as good as under the current system, because he was spared risks associated with endoscopy and surgery and the effectiveness of medical therapy is good.

G.C., an otherwise healthy 66 year old man, presents to the physician with essentially the same signs and symptoms as P.U. However, his symptoms are caused by a a small gastric carcinoma rather than by peptic ulcer disease. The less specialized physician he sees may not pursue this possibility as vigorously as would a more specialized physician, particularly a gastroenterologist. He is more likely to be treated "empirically" like P.U. was, to see if he improves. His symptoms may or may not improve, but the carcinoma will spread. Eventually, it will be discovered that he has cancer. The probability that he will survive the cancer will be reduced somewhat because of the delay in diagnosis. He represents, however, a minority of patients who present with symptoms typical of peptic ulcer disease. Under the "old" Medicare system for paying physicians, he would have been more likely to see a specialist earlier on in his illness course and to get a more extensive workup (at increased cost to Medicare).

L.H. is a 67 year old man with a large hernia that restricts his activities and causes him a lot of discomfort. He has mild congestive heart failure and a history of a recent heart attack as well as moderate chronic obstructive lung disease (COPD or emphysema). He should have surgery to repair his hernia as an inpatient, though some hernia repairs are done as outpatients. Some physicians might try to convince him to get by with a truss, but he strongly prefers surgery and is willing to pay the out-of-pocket costs for the surgery. He is referred to a competent general surgeon who advises him to enter the hospital for surgery. The surgeon suggests a consult from a cardiologist, but L.H. prefers not to spend the additional money. He comes through surgery all right, but the surgeon would have preferred to have had a cardiologist involved with the patient's care. He remembered patients in the past like L.H. who had not done as well. Not long afterward, he operated on a similar patient who also declined the cardiology consult. This patient suffered a heart attack during the surgery and died. Perhaps the cardiologist would have suggested precautions including delaying surgery that might have changed the outcome.

H.J. is an 83 year old woman who is in rather good health but has a very bad hip joint which needs to be replaced. Without a hip replacement operation, she may be forced to move to a nursing home; with it she can probably remain independent for a few more years. There is no question that she must have the surgery as an inpatient. Given her good health otherwise, she is not a high surgical risk. However, higher out-of-pocket costs for the hospitalization may result in her delaying the operation. This could in turn result in a longer period of symptoms and even loss of independence.

D.M. is a 65 year old man with insulin dependent diabetes mellitus. He has evidence of heart disease with angina and has recently begun having problems with infections of his feet; both are thought to be long-term complications of the diabetes. He has not been hospitalized for the diabetes. The most important tasks for his care are to maintain good "control" of the diabetes (that is, to maintain the blood glucose near normal) through careful monitoring of the blood glucose level and appropriate insulin therapy, and to establish good foot care to reduce the chance of infection and eventual amputation of his legs. This requires a considerable investment of time and effort by the patient and the physician as the patient learns to manage his diabetic therapy and to do proper foot care. The fee which Medicare pays for outpatient visits is equal to the fee charged by family practitioners in the area, but below the fee charged by a local endocrinologist with a particular interest in the outpatient foot care of diabetics. D.M. is financially able to pay the difference out of pocket. He receives excellent care from the endocrinologist and is able to avoid serious problems, e.g. gangrene, with his feet. A poorer Medicare patient may not have been so lucky.

A.M. is a 68 year old man hospitalized for an acute myocardial infarction (heart attack). He is found in the emergency room to have a serious arrhythmia (disturbance of the heart rhythm) that is corrected. He is admitted to the Coronary Care Unit (CCU) because he is at high risk of recurring arrhythmias and sudden death. The CCU at the hospital is staffed by excellent cardiologists. After a somewhat prolonged stay in the CCU due to recurrence of arrhythmias, he recovers and is

discharged from the hospital. The bill for the cardiologists' services in the hospital includes a considerable sum above what Medicare will pay. A.M. decides he cannot afford to continue to see the cardiologist as an outpatient, and is cared for by a family practitioner who insists on referring him to the cardiologist when he later develops worsening angina. With the cardiologist's care, his medications are changed and the angina improves. He must again pay the difference between the cardiologist's fee and the fee payable by Medicare. If the family physician, however, had not been able to convince the patient to pay the difference for care by the cardiologist, the angina may have become unstable and resulted in permanent damage to the patient's heart.

L.T. is a 69 year old man with a malignant tumor of his lip. He is very conscious of his appearance, and wants a plastic and reconstructive surgeon to do the surgery rather than a general surgeon. A general surgeon could do the surgery, but L.T.'s appearance would probably be less pleasing. Of course, the fee would be lower. Some might question whether L.T.'s appearance is all that important, but under the old system, Medicare would pay the higher fee of the plastic surgeon. L.T. is operated on by a plastic surgeon, but he has to spend a considerable sum from his meager savings for the difference between the surgeon's charge and the fee payable by Medicare. There were general surgeons available who would have done the surgery for less, and even a general surgeon who would have done the surgery for the fee paid by Medicare, but L.T. insisted. L.T. was very pleased with the result. He was glad he could afford the difference between the charge and what Medicare would pay.

R.A. is an 80 year old forgetful woman with poor hearing and eyesight who comes to the physician because her arthritis has worsened. She is independent and wants to continue to live alone, and fears that her arthritis will prevent that. She sought help from a family practitioner. He had a particular interest in chronic diseases like arthritis during his medical training, and chose family practice in part because it afforded him an opportunity to care for people like R.A. who need a continuing and broad approach to their medical problems. He sent her to a consulting rheumatologist who was unusual in that he accepted the fee paid by Medicare as his full fee. With the help of the

consultant, the family practioner was able to improve R.A.'s mobility and reduce her pain. She did well and continued to live alone. She was fortunate to find physicians so well suited to her medical and financial needs.

C.C. is a 72 year old woman with apparently localized colon carcinoma. She has diabetes, poor kidney function not requiring dialysis, and heart disease with a history of congestive heart failure, for which she is receiving several drugs. Under the old Medicare payment system her general surgeon would consult one or more subspecialists, each of whom could bill Medicare for helping to manage her several problems. He would also have an assistant at surgery. C.C. has surgery to remove her cancerous colon. She was unwilling to pay for a diabetologist to assist in her care, preferring that her surgeon alone take care of her. She survives the surgery, but has considerable problems with her fluid and acid-base status immediately post-operation, and her diabetes is difficult to control. She stays in the hospital for six weeks before getting well enough to go to a skilled nursing facility, and finally goes home after three more weeks.

I.L. is a 67 year old man who is due for removal of his second cataract, with replacement by an intraocular lens. He has some heart disease, but the cardiologist whom he sees regularly has determined that he can have the operation as an outpatient. Though not wealthy, he can afford to pay for the best intraocular lens (as well as the cardiology consult). The surgery goes smoothly and his recovery is uneventful.

Conclusions. What are the differences in the quality of the care received by these patients under the "old" Medicare payment system and the "new" fee schedule? Under the revised fee for service system, some patients would avoid surgery that would have provided them with little or no benefit; however, some would not get surgery that would have made them better. The number of technical procedures performed, such as endoscopy, would decrease. As with surgery, some procedures with little benefit would be avoided and some procedures with considerable benefit would not be done. Some consults that provided little benefit would be avoided and the costs would be saved by the patient and by Medicare. However, some hospitalized patients would be cared for by less specialized physicians than they would have been under Medicare's old

payment system. It is likely that for some patients the quality of care was less than it would have been if they had been cared for by specialists with extra training in the areas of their medical problems, or "modal specialists." Poorer people, for whom out-of-pocket costs would have a larger influence on the composition of care, would probably represent a disproportionately large fraction of those receiving lower quality care under the new payment system. Some patients might, on the other hand, receive better care perhaps attributable to the increased incentive for physicians to spend more effort in outpatient care and in talking to patients. Patients who need more counseling or more time from the physician rather than hospitalization, surgery, or technical procedures would seem most likely to benefit from this revised fee schedule.

Most of the reductions in quality of care likely to occur will be small; they will occur in or near the "grey areas" of medical decisionmaking (e.g., a patient with a small chance of having a curable cancer will not be evaluated if that evaluation requires the use of a technical procedure). For some individual patients, however, the effects will be large, e.g., a cancer missed because a technology was not used or a foot lost because a diabetic's glucose was not regulated carefully. To prevent such outcomes the quality assurance activites undertaken by Peer Review Organizations (PROs) or similar organizations will need to increase and focus on whether technologies are underused, whether consultations are underused and, in particular, whether the outcome would have been better if the care were provided by a "modal specialist".

In conclusion, we can say that some patients would receive better care under the alternative payment system, and some would receive poorer care. For the same level of total expenditures by Medicare and beneficiaries one might predict an improvement in overall quality of outpatient care. However, quality of care would decrease for some groups of elderly patients, such as those hospitalized and those with more severe illnesses who require specialized care. Poorer patients who are also sick would probably be at higher risk of having their quality of care compromised. It would be very important to monitor the quality of care received by the poor elderly to identify and correct problems if they occur.

Per Case Reimbursement For Inpatient Physician Services

Under per case reimbursement for inpatient physician services, a single prospectively determined lump sum payment is made for all physician services associated with a hospital stay, including fees for radiologists, anesthesiologists, and pathologists. (Non physician services and payment for some services of hospital-based physicians are already included in the hospital DRG payment). The recipient of the payment could be the individual attending physician, a group of physicians, the medical staff of the hospital in which the patient was hospitalized, the hospital itself, or some other entity. We consider here the individual physician and the medical staff as recipients.

Receipt of payment by attending physician. If the attending physician receives the DRG payment, his risks of significant financial losses (and gains) at the individual patient level are substantial. Physicians who care for patients primarily in high-variability physician DRGs are at particular risk. The heterogeneity of resource use within a physician DRG is considerable if the DRGs now used for prospective payment of hospitals are used as the basis of payment for physician DRGs, and each physician is likely to care for a small number of patients in a given physician DRG (Mitchell, 1983). The incentives to avoid caring for patients likely to require the use of resources that cost substantially more than the physician DRG payment may be great enough to reduce access to inpatient care for these patients. Similarly, there would be an incentive to reduce physician costs for all patients, once admitted. This could include withholding needed services.

These risks of financial losses and consequent incentives to reduce access to and quality of care for patients under physician DRGs with lump sum payment to the attending physician can be reduced if the financial risks to the attending physician can be lowered. Possibilities for reducing financial risk include development of a case mix adjuster that accounts for resource use at the level of the individual patient; this does not appear likely in the short run. Liberal definitions of outliers (cases with very high use which are to be paid for on a different basis) could reduce risk, as could some other

sort of stop-loss insurance. It is also possible to blend together a lump sum physician DRG payment with fee for service payments, with the relative weights on the lump sum payment and fee for service payments set so as to equalize average risk of significant gains and losses across DRGs (see Ginsburg et al, 1985, for an explanation of this technique and its application).

The rest of the discussion of physician DRGs with payment to the attending physician assumes that risks of significant gains and losses from caring for individual patients have been reduced through use of this blending technique. This should reduce substantially the possibility of restricted access to hospital admission for Medicare beneficiaries expected to require larger than reimbursable amounts of physician services.[1]

If the attending physician receives payment of a fixed amount per patient from which he must pay all other (consulting) physicians involved in the care of the patient (and pays himself the remainder), the attending physician has an incentive to cut costs of consultants and reduce his own services. Consultant costs can be reduced by requesting fewer consults and selecting consultants with lower fees. For a given level or quality of care, the attending can increase efficiency and reduce costs by improving the use of his own time, by requesting only those consults expected to provide a benefit in excess of cost, and by selecting more effective consultants for a given fee. He may also try to shift costs onto the hospital by substituting hospital services for physician services; for example, he may order multiple laboratory tests rather than obtaining a consult. In teaching hospitals, the attending physician would have an incentive to substitute resident physicians for his own and consultants' services, so long as residents' services remain "free" to him. If he values his own time less than the costs of consultants, he may increase his net return by substituting his own services for those of consultants. Quality of care will suffer if he

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[1] If one believes that fee for service payment for physician services provides an incentive to increase the amounts of physician services provided during a hospital stay, and that per-case payment provides an incentive to minimize the physician services provided, blending fee for service and per-case payment may lead to more nearly neutral incentives for the attending physician.

fails to request needed consultants or uses less expensive consultants who do not have the required skills, or if he substitutes his own inadequate services for those of needed consultants, or skimps on his own time with the patient. He has an incentive to "unbundle" his own and consultant physicians' services to the outpatient setting (where they can be billed fee for service) by completing much of the diagnostic workup prior to admission, and by discharging the patient as early as possible. As noted earlier, unbundling services to the outpatient setting may increase out of pocket costs to the patient and reduce the patient's demand for his services.

Some severely ill patients would be expected to use a large amount of both hospital and physician services for a particular DRG. Both the attending physician and the hospital have an incentive to avoid admitting such a patient. If both the physician and hospital were paid on a DRG basis, then the threat of reduced access to hospitalization for these patients would be greater than under the present system in which only the hospital has a disincentive to admit the patient.

The physician has incentives to increase admissions of patients that he expects to require relatively few physician services and to split one hospitalization into two or more where possible. As noted earlier, the influence of all these incentives on the physician's decisions is constrained by professional ethics, competitive market forces, and the threat of malpractice litigation, and particularly by utilization review.

The incentives under this system would also be expected to lead to more efficient use of physician services in inpatient care and lower consultant fees in specialties where fees reimbursed by insurance exceed those of a competitive market.

Patient examples. The net effect on quality of care depends on the balance of positive and negative factors and constraints. To illustrate the possibilities, we return to our imaginary Medicare patients (see Table of Patient Examples repeated on the next page). If D.M. and R.A. receive good ambulatory care, they will not be admitted to the hospital. I.L. will have his eye surgery as an outpatient. The use of physician DRGs will not directly affect their care.

Table of Patient Examples

(repeated for convenience)

P.U., a 66 year old man with peptic ulcers but otherwise in good general health; he has moderate financial resources

G.C., a 66 year old otherwise healthy man who has symptoms which suggest peptic ulcers, but in fact has carcinoma of the stomach

L.H., a 67 year old man with a large inguinal hernia, a history of myocardial infarction, mild congestive heart failure, and moderate chronic obstructive lung disease; he has few financial resources

H.J., an 83 year old woman in generally good health who has a bad hip joint which needs to be replaced

D.M., a 65 year old man with insulin dependent diabetes mellitus, heart disease with angina; he is beginning to have problems with his feet (e.g., infections) due to the diabetes; if the diabetes is not carefully controlled and good foot care maintained, he may lose his feet to amputation; he is financially secure

A.M., a 68 year old man with acute myocardial infarction and serious arrhythmias; he needs skilled intensive care to minimize the risk of sudden death

L.T., a 69 year old man with a malignant tumor of the lip; his financial resources are meager; personal appearance is very important to him, so he very much wants the best surgical care from a skilled plastic and reconstructive surgeon

R.A., an 80 year old woman with poor hearing and eyesight, whose worsening rheumatoid arthritis threatens to force her to leave her home for a nursing home

C.C., a 72 year old woman with apparently localized colon carcinoma requiring surgery; her diabetes, kidney disease, and heart disease make her a high surgical risk

I.L., a 67 year old man awaiting removal of his second cataractous lens with implantation of an intraocular lens

P.U. will be brought into the hospital only if medical therapy is not successful. If he is hospitalized for surgery, his good health for his age should make him a good surgical risk; he would also be a good "financial risk" under physician DRGs. There would still be the

possibility that the general surgeon caring for him would "hire" a less expensive person (and presumably less skilled, on average) to administer the anesthesia. Should complications develop following the surgery, his surgeon may less readily ask other consultant physicians to aid in caring for P.U. The possibility of premature discharge is always present under physician DRGs as it is under DRGs for hospital payments. That threat may be larger since both the attending physician and the hospital have a financial incentive to discharge each patient as soon as possible. However, P.U. should be at lower risk for reduced quality of care for his hospital stay than the average patient under the new physician payment system.

G.C. is also a relatively good surgical risk (and financial risk under physician DRGs). His surgery is more serious, and there will be more physician expenses for his case than for P.U. The per-case payment under physician DRGs should be correspondingly higher for more complex surgery such as G.C.'s. The possibilities for reduced quality of care for G.C. in hospital would be similar to those for P.U.

L.H., who needs to have his hernia repaired as an inpatient, may have some difficulty finding a surgeon to take his case if the physician DRG system does not give adequate weight to his heart and lung disease. His poor cardiopulmonary function make him a more expensive case than the average hernia repair. Let us assume that his surgeon gets the lump sum payment. (Under physician DRGs, it is unclear who would get it or how this would be decided.) The surgeon may be reluctant to request the cardiology consult that most patients like L.H. would have under the current reimbursement system because this will reduce the surgeon's net fee. If a cardiologist were asked to consult, the surgeon might prefer to choose someone other than the cardiologist that L.H. would have selected. Some people like L.H. will not get the cardiology consult, so will be at increased risk during and after surgery of suffering an adverse medical complication from the surgery; a few will have worse outcomes. On average, their surgery will be less expensive, but at the cost of increased risk to the patient. On the other hand, if the cardiologist receives the lump sum payment instead of the surgeon (let us say the patient had chronic heart disease and the cardiologist admitted the patient for the hernia repair), then he may pick a less

technically competent surgeon (one who has a higher hernia recurrence rate) than the patient would have picked if the money did not come from the physician's pocket. Note that mandatory assignment precludes the patients paying the differences.

H.J. should have no trouble getting a new hip. She is a good surgical risk, though her age increases the chance of complications and of a slow recovery from surgery. (Age could be used to adjust the per-case payment in a way different from that used for hospital DRGs; this might improve the access to high quality care for patients like H.J.) There is some chance that she will be discharged from the hospital earlier than she would under the present system because the physician and hospital both have an incentive to minimize her stay. The effect of the alternative payment system on the quality of her care should be minimal. If the cost of the hip joint to be implanted were to be covered by the physician DRG fee (rather than by the hospital payment under its DRG), there might be a tendency to implant a less expensive prosthesis. This points out that the incentives of the hospital and attending physician do not entirely coincide under physician DRGs, perhaps reducing the risk of skimping on services when compared to a system of a combined hospital and physician DRG payment system.

A.M. would almost certainly be admitted to the CCU because of the danger of sudden death from cardiac arrhythmia. There might be some question over who would direct his care. If his primary physician prior to the myocardial infarction were a family practitioner or an internist, that physician may wish to direct his care in the hospital, and use the cardiologist on a consult when needed basis. However, this would be more likely in the case of a patient who had suffered a less severe infarction. In A.M.'s case, it is more likely that a cardiologist would direct care in the CCU and perhaps for the whole hospital stay. Under either physician, the quality of A.M.'s care might suffer. If the family physician continued as the "attending physician" he might not use the expensive cardiologist as frequently as the patient's condition required. The family physician might also develop a "cut rate" deal with the cardiologist and the cardiologist might respond accordingly (do a less complete job). On the other hand, if the cardiologist was paid as the attending physician, then a trusted relationship between A.M. and

the family physician might be broken. Outpatient rehabilitation might be more difficult and outcome in terms of return to major acticity might be delayed. Thus, based on this example and many similar ones, it will not be easy to decide which physician to select to receive the DRG physician payment and which risks of adverse outcomes to accept as legitimate.

L.T. will find it more difficult to find a plastic surgeon than a general surgeon to do his operation; the fee would be the same to either of them under physician DRGs (we have assumed that all physicians accept assignment; the issues raised by assignment policy are quite thorny (Ginsburg et al, 1985)). He is unlikely to require consultant physicians in the hospital.

C.C.'s surgeon would almost certainly consult an endocrinologist and perhaps a cardiologist to help manage her diabetes and other problems during her colectomy. She would probably yield the surgeon a lower net fee than most patients (maybe even cost the surgeon money from his own pocket); there might be some difficulty in finding a high quality surgeon who is willing to take care of her. He may want an assistant surgeon at the surgery, and there is considerable probability that she will need time in an intensive care unit with its associated additional physicians' fees. The problems with access to high quality physicians depend on how well the DRG categories account for her multiple problems. The DRGs used for hospital care under PPS do not account well for the increased costs of patients with complex problems. Some patients like C.C. will be seen by fewer consultant physicians under physician DRGs than under the current system. This will reduce the average cost of care, and may adversely affect outcome. Likewise, if the endocrinologist was given the lump sum instead of the surgeon, then the quality of the surgical care might be more likely to suffer.

Conclusion. With DRG payment to the attending physician for inpatient physician services for Medicare patients, one would expect that some patients will not get needed consults that they would get today, while others will be spared the expense and risk of minimally beneficial consults likely to be obtained under the current payment system. Patients may have less choice as to which consultants are asked to see them. Access to inpatient care may be reduced for patients

expected to need more physician services for the expected DRG, and for those patients in any DRG whose reimbursement rates are mistakenly set too low by Medicare. Patients may be discharged earlier than under the present system of paying for physician services. If facilities for post-hospital care of such patients are scarce or poorly funded due to inadequate Medicare coverage, there will be more hardship for Medicare beneficiaries and greater risk of readmission for more care.

As mentioned above, whether quality of care is better or worse under physician DRGs than under the present system depends on how the negative influences are constrained by quality assurance, competition, and other factors. Quality of care will be better for some patients and worse for others. In particular, quality of care needs to be monitored for sick patients with acute comorbid conditions who are in need of multiple kinds of physicians. They will be most at risk. Will physicians, when acting as a consult, be less thorough than when acting as the attending? Will relationships with the physician who will follow the patient as an outpatient be broken, thus producing worse outcomes? Who should be paid as the attending, the surgeon who will do the operation or the patient's regular source of care? Who admits the patient to the hospital? Only a demonstration or an experiment is likely to answer these kinds of questions and to determine their effects on quality of care.

Receipt of payment by medical staff. The incentives for the attending physician may be quite different than those just considered under the form of physician DRGs with lump sum payment to the medical staff with payments to individual physicians apportioned on the basis of their weighted billings. The anticipated effects of this scheme depend on the degree to which the medical staff organizes to promote the common interests of its physicians. If the medical staff becomes well organized, the analysis is essentially the same as that for per case payment to the attending physician. The medical staff as a whole has an incentive to deny access to patients who are expected to require large amounts of physician services. Because many of these patients will also require large amounts of hospital resources, the hospital and medical staff will often have similar incentives to avoid admitting such patients.

If the medical staff is poorly organized, then the financial incentive for the attending physician is to increase his own care and billing for each patient until the expected return equals the value of his time; the expected return depends on the action of other members of the staff. The more services others provide, the lower the expected return to all physicians on the staff. Nonetheless, he may well increase services over the lump-sum-to-attending case, because there is some return to the additional services. The incentive for each consulting physician is similar. The attending physician has only a weak incentive not to request consults for his patients, as increased billing by the consults that he orders would cost him little. (The disincentive for the attending physician to request consults on his patients falls with the size of the medical staff. It is likely to be strong enough to reduce consults for a small hospital staff.) These incentives may result in some reduction in use of consultant services, but it would seem unlikely to be strong enough to cause an attending physician to forego consults that he felt were needed by his patient. It may also be too weak to reduce the use of inappropriate or unneeded consults. The individual incentive for attending physicians to avoid caring for patients likely to require relatively large amounts of physician services is similarly weaker than under lump sum payment to the attending physician.

Even a poorly organized medical staff would have an incentive to improve the efficiency of inpatient care through utilization review programs within the hospital, though the efficiency increase may be small. Financial gains from more efficient practice by a single physician would accrue to the whole group and only in small part to the individual physicians. Again, the incentive to organize for the promotion of efficiency is also an incentive to withhold needed services from patients, but the likelihood of the latter action would be smaller than under direct payment to the attending physician or to a well-organized medical staff, because each individual physician has an opposing incentive to increase his services to the patient.

The incentive to increase admissions that are expected to require relatively few physician services for the expected DRG and the incentive to admit patients twice for separable medical problems rather than treat both problems in a single episode would apply if the medical staff as a whole received payment as well as when the individual attending physician received payment. Whether this incentive would result in more unnecessary admissions under payment to the medical staff or payment to the attending physician would depend on the degree of organization of the medical staff and the degree to which the hospital and attending physicians or medical staff recognized their common financial interests in "gaming" the payment system. If one believes that patients were unnecessarily admitted prior to DRGs, the incentive to split admissions and to admit patients who did not require hospitalization (which is shared by the attending physician or the medical staff and the hospital) would be expected to result in an increase in unnecessary admissions and an increase in risks of iatrogenesis, and in reduced quality of care.

Increased Enrollment in HMOs

Our review of the literature suggests that traditional nonprofit HMOs, such as Kaiser Permanente and Group Health Cooperative of Puget Sound, provide care of roughly the same quality to their members (virtually all of whom are non-elderly) as the fee for service sector now provides. In addition, the HMO provides this care at lower cost. The limited extent of the evidence does not preclude the existence of some difference in quality of care in those HMOs studied versus the fee for service system, but large differences in technical process of care seem unlikely. If costs of health care for Medicare beneficiaries are to be reduced (or more precisely, the rate of growth slowed), then many believe that increased use of HMOs provide a cost effective means of doing so.

However, several points of caution are in order. Most of the evidence suggesting comparable quality of care comes from large, established, stable, nonprofit HMOs. Newer HMOs, particularly those organized differently, may perform quite differently. Data about their performance are virtually nonexistent.

Very few Medicare beneficiaries are currently enrolled in HMOs, and most of these few are enrolled in Medicare demonstration projects for which evaluation of quality of care is just beginning. The experience in the 1970s in California with Prepaid Health Plans for Medicaid recipients raises questions about the quality of new or rapidly growing HMOs, and about the ability of these HMOs to provide care of comparable quality to poor and sick populations as they provide to the employed populations they usually serve. The development of newer organizational forms within the category of HMO also brings into question the relevance of the evidence on quality of care in past studies of HMOs. In many cases, past evaluations of HMOs have contrasted the best prepaid group practices with a cross-section of fee for service practice. What will happen when the average or below average administrator and below average physician join a new for-profit HMO in which 10-20% of revenue is taken off the top? Will comparisons between these new HMOs and a cross-section of fee for service show equal quality of care?

The Medicare beneficiary population differs significantly from the largely employed and younger population served by most HMOs. The Medicare beneficiary is older, more likely to have chronic illnesses, and more likely to have conditions such as impaired heart or lung function that complicate management of acute illness. The administrative procedures and medical practice styles of HMOs are designed for a younger employed population, and may be less effective for the Medicare population. For instance, a person with a chronic illness or multiple interacting problems may gain particular benefit from having all care provided by a single physician. HMOs may not provide this degree of continuity of care, and more physicians may be involved in the care of each patient.

Medicare beneficiaries are more likely to have reduced sight, hearing, and mobility; some may have impaired memory or reduced mental capacity. Many HMOs maintain only a few locations where patients must come for care; this may make it more difficult for an elderly person to physically gain access to HMO care than to find a fee for service physician's office. HMOs are often large and bureaucratic. The administrative rules and regulations of an HMO may be unfamiliar,

confusing, and difficult to negotiate for an elderly person who is accustomed to the ways of fee for service providers who have an incentive to get the patient to return to them for future care.

On the other hand, if an HMO requires smaller copayments than do fee for service physicians, this will constitute a decreased financial barrier to care for Medicare beneficiaries. If the HMO provides comprehensive care in a single location, an elderly person requiring care for several different problems may find it easier to get care for those several problems in the HMO than through several solo fee for service providers.

As noted in the literature review, there is little evidence on the quality of care provided to the elderly in HMOs. The poor, who often have more complex medical problems than the non-poor, may provide an appropriate proxy for the more vulnerable in the Medicare population. The evidence reviewed supports the conclusion that there is some chance that the poor are less well served by HMOs than are the employed populations for which they have been designed.

Patient examples. Some of the kinds of problems which might be encountered by Medicare patients in HMO's are illustrated by our imaginary patients (see Table of Patient Examples, repeated on the next page). The care of A.M. in an established HMO would be expected to be much like that received in the fee for service sector today.

P.U. should have no difficulty receiving good care for his peptic ulcer disease from a good HMO. The HMO physicians would probably be relatively conservative in their workup and management of his problem, so he would be less likely than under fee for service to be endoscoped or to have expensive radiological procedures. He would be hospitalized for surgery only if conservative medical treatment failed. He would not be subjected to the cost, risk, or discomfort of a more extensive workup. Physicians in an HMO have no financial incentive to provide additional and unnecessary services; if they share in the financial outcome of the HMO, they have a personal financial incentive to reduce or delay use. They may be influenced by utilization control measures instituted by the plan or by the medical group. An HMO would have an incentive to attempt P.U.'s surgery as an outpatient; this might happen in a lower quality HMO.

Table of Patient Examples

(repeated for convenience)

P.U., a 66 year old man with peptic ulcers but otherwise in good general health; he has moderate financial resources

G.C., a 66 year old otherwise healthy man who has symptoms which suggest peptic ulcers, but in fact has carcinoma of the stomach

L.H., a 67 year old man with a large inguinal hernia, a history of myocardial infarction, mild congestive heart failure, and moderate chronic obstructive lung disease; he has few financial resources

H.J., an 83 year old woman in generally good health who has a bad hip joint which needs to be replaced

D.M., a 65 year old man with insulin dependent diabetes mellitus, heart disease with angina; he is beginning to have problems with his feet (e.g., infections) due to the diabetes; if the diabetes is not carefully controlled and good foot care maintained, he may lose his feet to amputation; he is financially secure

A.M., a 68 year old man with acute myocardial infarction and serious arrhythmias; he needs skilled intensive care to minimize the risk of sudden death

L.T., a 69 year old man with a malignant tumor of the lip; his financial resources are meager; personal appearance is very important to him, so he very much wants the best surgical care from a skilled plastic and reconstructive surgeon

R.A., an 80 year old woman with poor hearing and eyesight, whose worsening rheumatoid arthritis threatens to force her to leave her home for a nursing home

C.C., a 72 year old woman with apparently localized colon carcinoma requiring surgery; her diabetes, kidney disease, and heart disease make her a high surgical risk

I.L., a 67 year old man awaiting removal of his second cataractous lens with implantation of an intraocular lens

G.C. would also be expected to get a more conservative workup than he would get under the current fee for service payment system. His initial management would be a medical regimen. Eventually his gastric carcinoma would be discovered. The delay may reduce his chances of

cure. He is one of the small minority of persons who present with the signs and symptoms suggesting peptic ulcer disease who would benefit from a more extensive workup.

L.H. would receive care from a traditional HMO much like that described under fee for service. A good HMO might delay his surgery a bit longer than under fee for service, and there would be a higher probability that the cardiology consult would not be obtained than under the present system, but he would be expected to receive good care when admitted to the hospital. The cardiology consult might be foregone by the primary physician in a newer HMO which puts the physician at increased financial risk for the costs of referrals.

H.J. might have to wait longer than under the current fee for service system to get the hip replacement. There might also be some tendency to try to save money by implanting a less expensive prosthetic hip device. Such a device might work less well, with more pain and less mobility for H.J. If it were less durable, there would be an increased chance of repeat surgery in later years. If the HMO were well established and served a stable population, it might have to bear the financial costs of the repeat operation and so be less likely to skimp on the initial prosthesis. Though she might have to endure a longer wait for surgery than in the current fee for service system, H.J. would be expected to receive good care in an established HMO.

I.L.'s case is similar to H.J.'s. The issue of the quality of the intraocular lens to be implanted is again raised, as is the possibility of delay of surgery.

L.T. had recently joined a new and rapidly growing HMO. The primary physician who saw him when he presented with the lip tumor could see no good reason why an old fellow like L.T. needed a plastic surgeon. L.T. could not afford to go outside the HMO for the surgery, and he was advised that the surgery should be done without delay. After considerable time and effort spent in convincing HMO personnel that he should see another physician, he was given an appointment with a second primary physician in the HMO who agreed to refer him to an otolarygologic surgeon skilled in head and neck cancer surgery. The surgery went well and L.T. was pleased with the result. He was not sure he should have joined the HMO in retrospect. He felt that it was hard

to get the kind of care he was used to from the insurance plan he had had before retiring.

R.A. may need special help or a modification of the HMO's usual rules of operation if she is to get the kind of care she needs. The primary physician to which she is assigned might be less likely to use consulting physicians than if he worked under the current fee for service system. This may depend on how easily such consults can be made in the HMO; R.A. may have to come back another day to see a consulting rheumatologist. The quality of her care might be higher if she can see a single physician for all her visits to the HMO; that physician could better get to know her functional limitations. This is thought to be important for the care of people with chronic illness and elderly people with reduced ability to understand their own role in their care. Her physical and mental limitations may make it more difficult for her to negotiate successfully the physical barriers and administrative procedures of an HMO than those of a fee for service practitioner near her home. Any financial savings from receiving care from an HMO, however, would help her cope with her tight budget.

C.C. would be expected to receive good hospital care in a traditional, established HMO though surgery for her cancer might be delayed (Frances et al, 1984). Some HMOs might have a tendency to forego the full range of consults she needs to minimize her risk at surgery.

D.M.'s case raises issues like those discussed for R.A. He needs close, continuing care, with extensive education and counseling. In some HMOs, specialists like the endocrinologist that D.M. probably needs to see may be in short supply, and appointment waits may be long. If the HMO does not provide this care, he is at an increase risk of losing his feet.

Conclusions. These patients illustrate the effects on quality of care that might result from greater enrollment of Medicare beneficiaries in HMOs. Compared to the current fee for service system of reimbursing physicians, an HMO would be expected to reduce hospitalization for both medical and surgical purposes, and to reduce utilization of technical procedures in both diagnosis and therapy. The evidence available suggests that more of these reductions might come from those patients

for which the hospitalization or procedure was probably not needed (like P.U.), but some of the reductions may lead to a reduction in quality of care for those patients. There may be delays in getting care such as for elective but needed surgical procedures. These effects might be much greater in newer, less established HMOs if they are more cost-conscious. Consumer satisfaction with their care may be lower on the average than under the current system.

If HMOs are to provide care of a quality equivalent to the care provided their current members, they may have to modify their medical and administrative practices in response to the special needs of the sick elderly. If growth in enrollment is too rapid in established HMOs, or if new HMOs are not as well run as the better established HMOs, the likelihood of lower quality of care may increase. If newer HMOs are organized to put increased individual financial risk on primary physicians for the costs of their referrals or other resource use (the gatekeeper model), the possibility of skimping on needed care would increase. There is little evidence from which to predict the potential impact on quality of care of these newer HMOs and how it would differ from the established, stable HMOs that have been studied.

The need for monitoring of Medicare patients' experience in HMOs, particularly in rapidly growing or new HMOs, is clear. The evaluation of quality of care in Medicare's HMO demonstrations should provide additional information useful in designing such monitoring procedures. In particular, attention should be paid to making sure that preventable premature deaths did not increase among the elderly enrolled in HMOs, that functional status did not fall due to failure to provide services such as physical therapy, and that quality of life did not deteriorate for failure to perform expensive therapies such as coronary artery bypass surgery or artificial hip replacement when they are required. Of course, quality as well as length of life could increase if unnecessary procedures that caused disability were reduced or eliminated. Only carefully designed studies will address these effects and determine which ones will predominate.

More widespread use of HMOs may lead to problems due to adverse selection and preferred selection (Newhouse, 1982). If HMOs and other competitive health plans become a larger part of many healthcare

markets, there may be more competition among them than at present, and more pressure on them to attempt to influence their enrollment populations to their advantage (preferred selection or skimming). The Medicare population is more heterogeneous with respect to expected use of medical services than are the employed populations that constitute most of the people now eligible for HMO membership. This increases the incentive and opportunity for selection. If adverse and preferred selection led to enrolled populations among HMOs that required very different amounts of resources for their care, and these differences were not adequately compensated through differences in premiums to the HMOs, then those HMOs most burdened with sicker members would have a strong incentive to withhold services. This possibility must be kept in mind and somehow avoided if HMOs are to provide good quality of care to a large fraction of the population, particularly the Medicare beneficiary population.

Geographic Capitation

It has been suggested that Medicare could control costs of care, at least in a given contract period, through risk-sharing contracts with fiscal carriers for all care provided through part B to Medicare beneficiaries in an area (Jencks and Dobson, 1985; Wallack and Donovan, 1985; Burney et al, 1984). "Geographic capitation" essentially shifts some of the risk and some of the decisions as to how to pay for services and control utilization from Medicare at the national level to a number of carriers. It is not clear that this would facilitate control of costs or assurance of quality of care. Depending on the restrictions placed on contracting carriers by Medicare, there would be some variation in policies affecting Medicare beneficiaries and providers.

Several variations of this basic design have been discussed by the authors cited above. We will examine the effects on quality of personal health care of paying for all part B services through risk-sharing contracts with carriers. Although part B covers a variety of services, this discussion will for the most part be restricted to payment for physicians' inpatient and outpatient services and other expenditures ordered by the physician for outpatients: drugs, laboratory and radiological procedures, and devices.

In its simplest version, Medicare determines the total amount of Medicare payments for part B services in an area, and shifts decisions about financing these services to the carrier. How are the amounts provided the carrier in each area to be determined? Each carrier could be given an amount reflecting the historical part B costs in that area; this would initially preserve the differences across regions and areas in part B expenditure levels.

How is the carrier to decide how to pay for part B services and to control total costs? A carrier could rely on a policy designed to increase the enrollment in HMOs in order to control utilization and costs; the implications of increasing HMO enrollment for the Medicare population were discussed earlier. The carrier could continue to pay fee for service using the current Medicare mechanism to set fees for physicians' services, and rely on coverage policy and utilization review of part B services to control total expenditures. It could pay fee for

service using a modified fee schedule such as that analyzed earlier. It could negotiate preferred provider contracts. Little is known about the impact of preferred provider arrangements on quality of care.

It has been suggested that a carrier reimburse fee for service for physicians' and other part B services, and maintain control of the budget by making the actual fee paid for each service vary inversely with the total amount billed by all physicians to the carrier in each period. While this scheme would be expected to maintain control of expenditures, at least in the near term, its effects on utilization and quality are difficult to predict.

If there were not strong external utilization controls by the carrier or its designate, physicians would have financial incentives similar to the present system, except they would consider the expected fee, which would depend on how many services were delivered by all other physicians. If total billings exceeded the budgeted amount, the fee payable for each service would fall. Past evidence from the fee for service system suggests that many physicians would then increase the number and complexity of their services billed and reduce their acceptance of assignment (Rice and McCall, 1982; Gabel and Rice, 1985). The increase in out of pocket costs to patients would reduce the financial access of those patients more influenced by out of pocket expenditures; one would expect a larger effect on the poor without Medicaid. Those physicians who were influenced by these incentives and so increased billing would tend to maintain their incomes, while those who did not respond to reduced fees would experience reduced incomes. They in turn might be more likely to increase billing and reduce their willingness to accept assignment. It is not clear where this process would stop.

If, instead, a carrier were to rely on utilization review to control total expenditures, how would quality of care be affected? Unless additional primary data were collected from the physicians it would be difficult for a carrier without substantial help from physicians in the area to develop utilization control measures that could differentiate between variations in utilization due to case mix from those due to inefficiency. Thus, a carrier run system without physician support could penalize efficient providers as well as inefficient ones.

If it were possible to determine that some areas are now overutilizing part B services relative to others, then appropriate adjustments in amounts contracted for could be made (or perhaps a competitive bidding process would help determine the appropriate amounts). However, we do not have the knowledge to do this. Although the large amount of variation across small areas (Wennberg and Gittlesohn, 1982; Wennberg, 1985) and areas as large as states or Medicare carrier districts (Brook et al, 1984) cannot easily be explained by differences in patient characteristics or justifiable variation in medical practice patterns, it is not known whether high use areas represent overutilization or low use areas underutilization on average (Brook et al, 1984). A single area may be a higher than average user of some services and a lower than average user of others. We do not now have the information necessary to determine the "appropriate" or optimal amounts to provide for payment for part B services in each area. Nor do we know what effects any of this would have on quality of care.

If the carrier were able to identify those services for which benefits were smallest relative to cost and selectively decrease the use of those services through utilization controls or financial incentives, patients could well be better off. For instance, effective utilization review of hospitalization and technical procedures might yield this result. Identifying minimally beneficial services could be done by combining critical literature reviews and decision analysis supported by sensitivity analysis and expert panels. Such a strategy would require the active cooperation of the physician community. It could not be implemented by the carrier alone.

Packaging Ambulatory Services

We have not defined a payment scheme for ambulatory services, but rather will raise and briefly discuss several issues in this area. Some initial work has been published on the feasibility of constructing packages of outpatient care upon which fixed payment per unit could be based (e.g., Fetter et al, 1984) and this work is continuing. However, the evidence currently available does not provide the basis for a fully designed payment system for packages of outpatient services.

The first issue is whether payment is based on a visit, as with the current reimbursement system, or on a larger unit such as an episode of care. It is not clear whether episodes of care can be easily defined for this purpose. Episodes of chronic illnesses could perhaps be defined as a fixed period of time such as a year. The definition of the episode must minimize the incentive to shift resource use outside the defined episode for separate billing, or to an inpatient stay. Preliminary work suggests that the variability of resource use for an episode of illness would be large. Some of the problems raised by variability were discussed under the physician DRG option.

Which services are to be included in the package? Payment for an outpatient visit is generally expected to cover the physician's time, the overhead expenses of personnel and facility, and in some cases the cost of limited ancillary services (e.g., simple laboratory tests). This package could be expanded to include all ancillary services ordered during a visit (laboratory, other pathology services, radiology services). Expensive devices needed by the patient (e.g., a glucose measuring device for a diabetic, ambulatory oxygen equipment for a person with severe chronic lung disease) would not likely be included.

Paying a fixed price per outpatient *visit*, regardless of its site (physician's office, emergency room, hospital outpatient clinic), would encourage the physician to provide care in the least expensive site. It is not clear how this would affect quality of the care. Including ancillary services in the fixed visit payment would provide an incentive to minimize use of these services. There is little evidence on the amount or appropriateness of outpatient use of ancillary services or laboratory tests. If there is not now overuse of outpatient diagnostic tests, an incentive to reduce them would not be expected to lead to improved care. It might in fact lead to worse care. For instance, bacteriology tests to diagnose infected urine or strep throats might be reduced from their current low level.

Assuming that episodes can be defined, most issues that arise for ambulatory payment packages based on *episodes of care* would seem similar to those for payment based on a visit. For episodes of care, the additional question of payment for consulting physicians arises. If

their services are to be included in the unit for which fixed payment is made, issues like those discussed under physician DRGs arise.

There are a number of important issues to be faced in the design and implementation of packaging of ambulatory services. The proper attention to these issues will be important if quality of care is to be preserved or perhaps improved. Perhaps the most important question arises from the dearth of information about the content and quality of ambulatory care. We have little or no evidence suggesting over utilization of outpatient services. Reducing the services provided per visit or per outpatient episode may reduce quality of care. It may also result in higher inpatient expenditures if care is shifted from outpatient to inpatient settings, or if a condition inadequately cared for worsens to the point that inpatient care is required. If the primary purpose of paying fixed prices for defined packages of outpatient services is to "contain costs" by reducing the services provided (e.g., ancillary services), then the institution of packaging of outpatient services may be ill advised without a small-scale demonstration. It may lead to delay in admission, increased severity of illness at time of hospital admission or the development of complications that otherwise might be prevented. All of these outcomes can be measured.

Procedure Packages

Several issues are raised by the possibility of paying a fixed price for diagnostic or therapeutic procedure packages. These packages could be defined by analogy with inpatient surgical episodes. According to Mitchell et al (1984), such packages can be designed to exhibit less variability of resource use than inpatient medical (as opposed to surgical) episodes. The fixed payment could apply regardless of site of service for some procedures.

Paying the same amount for physician services regardless of site of service may change the incentives for providing the service in the hospital or in an outpatient setting. However, physician fees for services provided in the office have traditionally included overhead costs, while physician fees for work in the hospital have not. If there is not to be a financial incentive to provide services in one site over

another, compensation for this difference must occur. If procedure packages are defined to include only physician services, then the incentives for use of services such as those of consultant physicians are analogous to those discussed under physician DRGs. If ancillary services (laboratory, pathology, and radiology) are included the issues are similar to including them in ambulatory visit or episode packages.

If the packages are comprehensive, including physician services, ancillary services, the facility costs and support personnel, then more difficult issues are raised. We assume that the lump sum payment for the procedure is made to the attending physician. His fee then is the residual after paying for the facility charge, the ancillary services, and other physicians' charges. If a device such as an intraocular lens or prosthetic joint is used, the payment must also cover that cost. The attending physician has an incentive to minimize these other costs: to avoid use of "unnecessary" services, and to skimp on needed or useful services. Particular problems may be caused by including the facility costs and the device costs in the package.

Consider the incentives facing the attending physician for cataract lens removal with implantation of intraocular lens. First, there is an incentive to implant a less expensive lens. The less expensive lens may provide a lower quality outcome for the patient. The physician does not suffer a financial loss if this lens must be replaced sooner than a more expensive lens would have to be replaced. This would possibly be controlled by specifying the lens to be paid for. Second, consider a patient awaiting this procedure who has comorbid conditions that markedly increase the risk of doing surgery as an outpatient. The facility cost and perhaps the cost of other personnel (which must be paid by the physician) for an inpatient procedure is much greater than for the outpatient surgery facility. Unless the fee takes account of these circumstances, the attending physician's incentive to perform the procedure as an outpatient is strong. The quality of care for the patient would then be at risk. Complications might be ignored. Utilization review through PROs could be used to prevent inpatient procedures from inappropriately being moved to the outpatient site or to make sure that minimal services were provided.

V. CONCLUSIONS AND POLICY IMPLICATIONS

This analysis has not led us to confident detailed predictions of the effects of alternative physician payment systems on quality of personal health care. It has provided a framework within which one can attempt to anticipate the effects of such a change on quality of care, and has illustrated the approach with several examples of alternative physician payment systems. For each alternative system, the analysis has pointed to types of patients or areas of medical care where changes in the quality of care are likely (see Tables 1 and 2). This information should be of value in monitoring the quality of care under such alternative systems.

The analysis focuses on the relationship of quality of personal health care to the way we pay for physicians' services. While this is an important influence in quality of care, it must be put in perspective. If one wishes to improve the quality of personal medical care, one might look to other mechanisms as well as modification of physician payment schemes. Luft, in reviewing the evidence comparing quality of care in HMOs and fee for service medicine, noted that "all delivery systems exhibit substantial deficiencies [in quality of care] when evaluated against specific standards, and in general these deviations from the standards are far larger than the differences between HMO and fee for service providers." (Luft, 1981, p. 211) It may be that other initiatives, alone or in combination with changes in the physician payment scheme, would lead to greater improvements in quality of care or greater cost savings without reducing quality of care than an alternative payment mechanism by itself. Increased knowledge of the relationship of medical practices to patient outcomes through technology assessment (Office of Technology Assessment, 1980; Bunker et al, 1982) and studies of practice patterns (Brook et al, 1984) are essential to rationally formulating initiatives to change medical practice through whatever mechanism. Developing and establishing more effective quality assessment and quality assurance systems, which are too infrequently used today, may be essential for improving everyday medical practice.

Such programs have the potential to raise the level of quality of care delivered by the bulk of practitioners toward the level possible within the limits of current knowledge.

The most important conclusion of our analysis is this: we do not know enough to quantify the effects of changing the physician payment system on quality of care. Indeed, we know relatively little about the quality of our present system of care. Given this inability to predict the effects of change on quality of care, we believe major changes in physician reimbursement are best done at first on a small scale. In any event, we strongly recommend that when changes such as those analyzed here are implemented, the quality of care be carefully monitored. Such monitoring will require collecting data not only about the processes of care but outcomes as well, particularly increased premature mortality, decreased functioning and quality of life, and increased morbidity. If such outcomes occur, studies can be designed to determine whether they are causally linked with changes in the way physicians are paid. Unless quality of care is monitored and appropriate responses made to changes in quality, we believe that many Medicare eligibles, especially the poor and the frail elderly, will have their care compromised by many of the proposed changes in the way physicians are paid.

Table 1

THREATS TO QUALITY OF CARE UNDER EACH PHYSICIAN PAYMENT SCHEME
(COMPARED TO CURRENT MEDICAL CARE)

Event	Fee Sched	HMO	Physician Inpt DRGs	Geographic Capitation	Amb Visit Package	Proced Package
Receiving unnecessary care	-	-	-	+	?	?
Reduced access to physician services	++	+	0	?	?	?
Reduced physician care per episode	0	+	+	?	+	?
Care from less specialized physician rather than "model specialist"	+	?	++	0	?	?
Needed consult omitted	+	+	++	0	+	+
Less thorough diagnostic workup	0	+	++	?	+	NA
Less thorough care for chronic illness	0	+	NA	0	+	NA
Discharged too early from hospital	0	+	++	0	NA	+
Inappropriate shift of care from hospital to outpatient site	?	+	+	0	NA	++
Reduced access to care for patients with more complex (and costly) cases	+	+	+	?	+	+
Reduction of	-	?	NA	+	++	?

needed ambulatory services					
Reduced patient education and counseling	-	+	+	?	+	NA

0 Indicates no change in threat.
- Indicates a lesser threat than under the current payment system.
? Indicates great uncertainty as to effect on quality of care.
+ Indicates a greater threat than under the current payment system.
++ Indicates a much greater threat than under the current payment system.
NA Not applicable

Table 2

MOST IMPORTANT THREATS TO QUALITY OF CARE UNDER ALTERNATIVE PHYSICIAN PAYMENT SCHEMES

Fee for service with fee schedule:

1. Receive care from less specialized physicians, including consultants, with potential for lower quality care for difficult acute and chronic medical and surgical problems (e.g., less effective care for chronic medical problems, higher risks during surgery)
2. Reduced access to specialist physician care, expecially for poor people
3. Reduced patient satisfaction with care

Increased use of HMOs (prepaid health plans):

1. Failure to provide or delayed needed hospital and surgical services
2. Difficulty in understanding how the HMO works, and in getting needed care, expecially for elderly with mental or physical impairment
3. Reduced patient satisfaction with care
4. Reduced coordination and thus quality of care for chronic illnesses
5. Reduced accomodation to special individual patient needs

Payment for inpatient physician services by DRG:

1. Less thorough physician care in hospital
2. Needed consults not obtained or less specialized consultants in hospital, with potential for lower quality of surgical and medical care, particularly for patients with more complex or severe illness within a DRG
3. Reduced access to inpatient physician care for those with more complex illness within a DRG
4. Premature discharge from hospital
5. Unnecessary hospitalization for patients with "easy" cases for a

given DRG

Geographic capitation:

1. Increased unnecessary physician services
2. Inappropriate utilization review actions
3. Reduction of needed ambulatory services

Ambulatory service packages:

1. Reduction of needed ambulatory services, (especially if ambulatory services are not now overused)
2. Reduced access to care for those with higher resource needs within each ambulatory service category if basis for payment does not account well for hetergeneity of resource use

Procedure packages:

1. Reduction of needed consults if consultant physician services included
2. Inappropriate shift of procedures to less expensive sites with increased risk to patient if facility charge included
3. Reduced access to care for those with complicating conditions unless packaging scheme accounts for complicating conditions

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